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THE PROCESS OF PERCOLATION.

By Edward R. Squibb, M. D.

The Pharmacopœia very judiciously recommends that the process of percolation be restricted to the practice of those who may have had experience or instruction in manipulation. This restriction is rendered necessary by the circumstance that in the application of the process a very little bad management is liable to produce imperfect results, and be wasteful. The facility and great convenience of the process has, however, led to its general adoption, regardless of the wholesome restriction, and it now only remains to be seen whether, by simple means, its general application may not be established without risk of bad results.

In the practice of percolation for some years past, the writer has, from time to time, observed results which have led to the adoption of a few simple rules in the management of the process. And as these rules, if observed with ordinary care, render the process quite as certain as that by maceration, in any hands, they are communicated in the hope of being of some value.

Substances to be exhausted by percolation should generally be so comminuted as to pass through a sieve of 24 meshes to the linear inch.

The substance should be wetted with the menstruum until the liquid is no longer absorbed by the powder, and should then

stand in a covered vessel for twelve hours before being put into the percolator.

The percolator should have a heighth equal to four times its diameter, at least, and should be furnished at the lower end with a stop-cock, or India-rubber tube, by which to regulate the rate of percolation. Upon the perforated diaphragm of the lower part should be placed two disks of flannel, with a disk of filtering paper between them.

The wetted substance should be put into the percolator compactly, but not tightly, so as to occupy about five-sixths of the capacity of the percolator, and be covered by a disk of flannel tucked down round the edges.

There should be a stratum of menstruum kept upon the substance in the percolator, until the whole of the prescribed quantity of liquid has been added.

The rate of percolation should be so controlled that in percolating one pound of substance the percolate should drop into the receiver at the rate of one drop every two seconds, or about 3 f.$\overline{3}$ per hour; and for larger quantities in the same ratio.

The first and last of these simple rules are most important, and if carefully observed will furnish good and equable preparations. The controlling the rate of percolation proved to be so important to the process, that the writer very soon abandoned the attempt to do this by the mere packing of the substance in the percolator; whilst the alternative adopted for the purpose in a great measure obviates the necessity for the skill and judgment necessary in manipulating each particular drug. The most common faults in percolation are in having the substances too coarsely powdered, and in percolating too rapidly.

By attention to the rules above given, and by the adaptation of a few little simple contrivances, (which any one can make for himself,) such as are shown in the adjoining sketches, the process has become in the writer's hands so convenient, easy, and so automatic, that it has ceased to require or attract any particular attention.

Figure 1 is a centre section sketch of an automatic percolator, which the writer has for some time had in use, drawn on a scale of half an inch to the foot.

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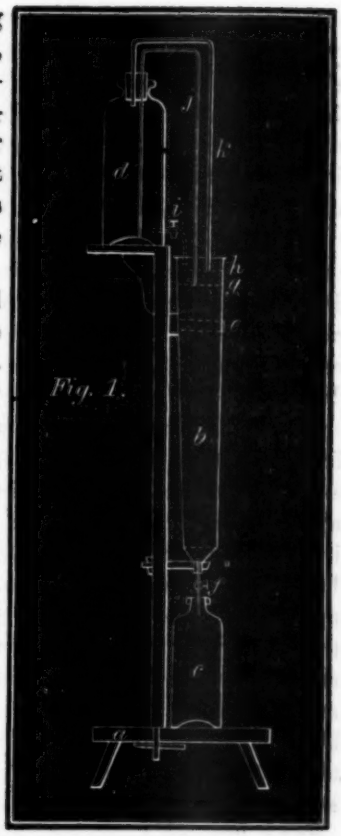


Fig. 1.

a, is a stand for the receiving vessel. Into the stand is secured, by mortise tenon and pin, an upright of 2 by 4 inch plank, to support the percolator. On the upper end of this, supported by what mechanics call an o g bracket, is a small shelf or platform for the menstruum reservoir.

b, is the percolator, supported upon a perforated bracket at the lower end, and attached to the upright support at the upper part by a strap and buckle, *e*. Into the lower opening a small glass stop-cock, *f*, is fitted by means of a perforated cork. This stop-cock may, without inconvenience, be replaced by two short pieces of glass tube, and an inch of India-rubber tubing of corresponding size. One piece of the glass tube is fitted to the percolator by a perforated cork, at one of its ends. The India rubber tube is then stretched over the other end of this first glass tube, while the second piece of glass tube is inserted into the India-rubber tube below. A piece of thread being then tied loosely round the India rubber portion may be made into a good compression stop-cock, by inserting a little wedge of wood between it and the India-rubber tube. The farther this wedge is pushed in, the more it contracts the tube. The lower piece of glass tube may be dispensed with, but the contrivance is not so neat. Where this tube enters the receiving bottle, it should be tied round with paper or muslin to prevent loss by evaporation.

The upper end of the percolator should be tied over with sheet India-rubber, in which two holes have been made for the tubes.

d, is the menstruum reservoir, large enough to hold an entire

charge of menstruum. It is fitted with a good cork, and two syphon tubes that pass into it air tight. The inner syphon, *j*, is small, and passes from near the bottom of the bottle to near the surface of the substance in the percolator, so that both its ends may be always immersed while in action. It conveys the liquid from the reservoir to the percolator upon the principle of a syphon, but can only act as air is admitted to the reservoir.

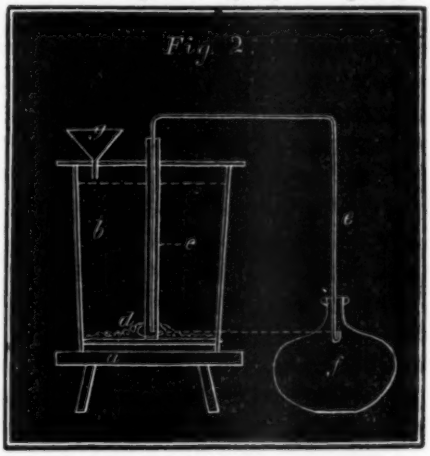
The second tube, *k*, is of much larger calibre. If less then 4 to 6 lines diameter it works badly, while if less than 3 lines it does not do at all. This tube should be about half inch bore, no matter what scale the apparatus is on. It passes from the neck of the reservoir bottle, air tight, through the cork, and down into the percolator, terminating by an oblique or pen-shaped end, about one inch above the end of the syphon for feeding. This large tube is for supplying and for limiting the supply of air to the reservoir, and this it is which renders the apparatus automatic. The reservoir being filled and set upon its support, and the percolator ready, the reservoir is tilted backward and air blown through the large tube. This immediately starts the feeding syphon, when the reservoir is allowed to take its proper position, and the apparatus abandoned to itself. The feeding syphon will run until the substance is fully saturated, and until the stratum of menstruum above it rises high enough to close the end of the large air tube. This liquid then of course shuts off the air from the reservoir, and as soon as the columns of liquid balance each other the feeding syphon stops. The stop-cock, *f*, at the receiver, is now carefully adjusted to the proper rate of percolation, and the apparatus left to take care of itself. As soon as, by percolation, the stratum of liquid above the substance falls so as to expose the upper part of the opening at the end of the large air tube, a bubble of air passes up into the reservoir, and a corresponding bulk of the menstruum flows out through the syphon tube, and this action is kept up so long as there may be any menstruum in the reservoir.

The feeding syphon, *j*, may be replaced by a stop-cock, *i*, as shown by dotted lines, but vessels with stop-cocks are very expensive, and no better than those which are plain, and arranged with a syphon. The pendant portions of both the tubes from

the reservoir may be of India-rubber tubing, and as it is only this portion of the air tube that need be so large, it is very convenient to arrange it thus: slipping the larger India-rubber portion over the smaller glass portion.

With a four gallon reservoir of menstruum, and a receiver of corresponding size, this apparatus will take care of itself until the process is finished; and the writer, in a slow percolation, for saturated tinctures, for instance, has often had it to run on eight or nine days untouched.

Another convenient form of percolator, which the writer contrived, and has often used on various scales from a quart specie jar up to a hogshead, has some advantages, particularly on the large scale, as where a barrel of menstruum is to be used as in exhausting sarsaparilla, &c., for compound syrup. Figure 2, represents this arrangement of apparatus, except that it is not necessary to represent the feeding reservoir. Where the supplying arrangement of the last drawing is used, it is done simply by mounting the barrel of menstruum upon a proper stand above the level of the cover of the percolator, and then adapting the large India rubber air tube to the bung hole, and putting an ordinary faucet in any low portion of the barrel; or, more simply, as the writer has done, by using a small India-rubber tube for a feeding syphon, inside of the large one for air, allowing the small one to project two inches below the larger one, where they pass through the funnel opening at *g;* and ensuring, by a weight attached, that the other end of the small tube goes to the bottom of the barrel. By this simple, easy arrangement, any operation of percolation or washing may be performed at any rate of speed or to any desirable extent.



a is a simple stool upon which stands the tub or other perco-

lator vessel, *b*, and it matters not whether this vessel be a specie jar or a mixing tun.

c is a tube standing erect in the centre of the vessel, and, upon the scale of the drawing, of about two inches diameter. This tube, if of metal, has about one inch of its lower extremity perforated with holes; or if of glass, simply broken off irregularly. Around the lower end of this, a ball of clean tow or straw is wound rather loosely. Over the tow and end of the tube, the centre of a large disk of blanket is passed, and tied firmly around the tube a little above the tow or straw. The blanket is then reflected out over the bottom of the tub, where it forms a stratum for conducting the percolate, as shown at *d*. The wetted substance to be percolated is then filled into the tub upon this blanket and around the tube, and packed equally. The menstruum being then admitted through the funnel opening in the cover at *g*, saturates and percolates the substance, and passes into the tube or well, *c*, rising to the same level in the well that it is in the tub outside. The remainder of the contrivance consists in the means of drawing off this percolate from the well by a syphon that shall never empty itself, and of regulating the rate at which this is accomplished. The syphon, *e*, may be of glass or metal, or what is much better, of India-rubber tubing. It should pass from the bottom of the well inside the tub to a little below the bottom of the tub outside, and the outer end should be furnished with a small piece of glass tube bent in the form of a U. Until all the menstruum has been added, the free extremity of this U should be kept at about the level of the substance in the tub, or a little lower, if the rate be regulated by a string and wedge. But when all the menstruum has been added, it must be dropped down below the bottom of the tub. By the U shaped end, this little syphon is prevented from emptying itself, so long as there is liquid in the well, no matter at what level it may be kept, and it may be made to keep the well entirely exhausted of percolate if desired, or to keep it at any given level. Indeed, in all respects, there can hardly be a more manageable or convenient arrangement than this, whether for operations on the large or small scale, and it may be recommended as the cheapest as well as most convenient percolater known to the writer.

Louisville, Ky., January, 1858.

PHARMACEUTICAL NOTICES.

By James R. Mercein.

Syrup of Orange Peel.—The officinal formula for this preparation is liable to the objection that the boiling water used in the process takes up a large quantity of the inert gummy matter, which causes the syrup to ferment after being made but a short time. To obviate this, I have devised the following mode of preparing it, which I find to answer very well. The alcohol that remains in it when finished, while too small in quantity to act as a stimulant, serves to render the syrup more stable. This method* is based on the principle Mr. Finley has so happily used in preparing syrup of tolu, (see U. S. Disp. p. 1215) *i. e.* impregnating the water with the flavoring ingredient by means of magnesia.

℞.	Tinct. of Orange Peel,	℥vi.
	Carb. Magnesia,	ʒii.
	White Sugar,	lbs. iss. (avoirdupois.)
	Water,	℥xii.

Evaporate the tincture to ℥ii. by means of a water-bath; then triturate with the magnesia, and add *very* gradually, the water. Filter, and form a syrup with the sugar.

Citrine Ointment.—In making this ointment, instead of confining myself to the use of neats-foot oil as in the officinal process, I have tried experiments with various fixed oils and fats. I have done this, partly, because I desired to find a substitute for the officinal ointment, which as a general thing does not keep well, becoming discolored and friable in a short time; and partly because I wished to discover how, and in what degree, other oils and fats would be suitable for the purpose, in case neats-foot oil was not readily obtainable. I have arrived at the following conclusions, which, though crude and imperfect, yet convey a general idea of what can be done in this way.

From *Castor Oil.* The ointment made from this, though at first of a good color and consistence, changed in a short time to a dark brown hue. When one-third lard was added, the ointment retained its original properties very well.

* Since this paper has been in type, I have learned that a similar process was published in this Journal in 1854, page 298.

With *Ground Nut Oil*, (Arachis hypogea), the result was good, as the ointment kept its golden color and soft consistence perfectly, and altogether appeared to be a stable preparation.

With *Oil of Sweet Almonds*, the reaction, even at a high temperature, was slow, although the ointment resulting is of a light color and good body.

The ointment from *Palm Oil* was rather friable, though permanent in color. The peculiar odor of the oil was retained to some degree.

I lastly tried what results would take place when *Butter* was used. Having removed the salt by repeated washings, I treated it as before. The reaction, even at the temperature of 200°, was very slow, and the gas was evolved with little force, although the vapor filled the room. The ointment resulting was of a light yellow color, and of soft and unctuous consistence, and was altogether the most satisfactory one of the whole series. At the end of a month, its texture was unaltered, while some of the officinal, made at the same time, had changed in color, and assumed a mottled appearance. I made use of the following proportions in preparing it.

℞ Butter, fresh, ℥xii.
Mercury, ℥i.
Nitric acid, ℥xiv.

Treat them as directed in the officinal process.

By these experiments it will be seen that ground-nut oil and butter would answer best as substitutes. The butter especially, I am confident, only needs to be tried to be appreciated; for the result, to me at least, was eminently satisfactory.

Honey of Roses—This preparation, as now made, invariably ferments after a short time. To remedy this I have used glycerin in place of part of the honey, and with good success. By using *eighteen* instead of *twenty* ounces of honey, as directed, evaporating down to *fourteen* ounces instead of a *pint*, and adding *two ounces* of glycerin, and then straining, the preparation will keep for a long time. It might be of advantage, perhaps, to use more glycerin than this, though I have found two ounces to answer very well.

Jersey City N. J., Jan. 27th, 1858.

COMPOUND SYRUP OF THE IODOHYDRARGYRATE OF POTASSIUM AND IRON.

By Joseph E. Young.

Being called upon to prepare a formula containing the Red Iodide of Mercury and Iodide of Iron in solution, to be used in cases of secondary syphilis combined with scrofula, the following suggested itself as being a good one, and an elegant mode of administering the iodides in combination.

℞.			
	Iodine,	grs.	64
	Iron filings,	"	32
	Red Iodide of Mercury,	"	2
	Iodide of Potassium,	"	1½
	Sugar,	oz.	3½ avd.
	Water,	"	2

Mix the iodine with three drachms of the water and add the iron; when combined filter into the syrup, (which is made with an ounce and a half of the water,) the red iodide of mercury and the iodide of potassium are triturated with the remaining drachm of water and added, the whole to measure four fluid ounces. A little orange flower water added, makes it very agreeable. The dose recommended is about one teaspoonful, which is equivalent to 1-16th gr. of the red iodide of mercury and 2¼ grs. of the iodide of iron.

Williamsburg, N. Y., January 1858.

EXPERIMENTS AND OBSERVATIONS UPON THE SORGHUM SACCHARATUM, OR CHINESE SUGAR CANE.

By Joseph S. Lovering, of Oak Hill, Philadelphia.

[The above is the title of a pamphlet, published last month, which possesses so much intrinsic interest to the consumer, as well as to the producer, of sugar, that we have endeavored to convey, as correctly as possible, an idea of its contents in the following abridgement. The well known ability and success of Mr. Lovering, in all that pertains to the chemistry and manufacture of sugar, give every confidence in the accuracy of his results. *Editor Am. Jour. Ph.*]

The introduction of this plant into the United States, and the hope of producing sugar from it at the North, profitably, have

excited such universal interest, that it has this year been planted in almost every State of the Union; and, as the season has advanced, the opinions early expressed by many intelligent and scientific experimentalists, that it contained no crystallizable sugar, have apparently been confirmed by later trials. A few crystals, it is true, have been obtained in one or two instances, but all hope of producing sugar from it profitably seems to have been abandoned.

My object in making the following experiments has been to throw what light I could upon this important question, and, in the event of the result proving favorable, to give such a formula as would enable the uninitiated to proceed with confidence of success. They have been pursued without any attempt at extraordinary production, either in the cultivation of the cane, or the developement of its properties; on the contrary, the experiments were made in small quantities, under many disadvantages that would not occur in large operations, and consequently with results less favorable.

On the 10th of May, (1857,) I planted about half an acre on upland of good quality, such as would yield, in ordinary seasons, 50 to 60 bushels of Indian corn to the acre. The rows 4 feet apart, and the plants intended to be 6 inches apart in the rows, but which, on taking off the crop, proved to be a little over 7 inches apart. When the canes were about 18 inches in height I had the suckers removed. During the month of June I passed the hoe-harrow through it twice, a man following with the hand hoe, as in the case of Indian corn. It was then left to take care of itself. It grew rapidly and evenly, and attained the height of 12 to 14 feet.

My apparatus and utensils for conducting the experiments consisted of the following, viz:—

A pair of iron rollers, 7 inches in diameter and 12 inches long, set in a frame $\frac{1}{8}$ of an inch apart, with spout to catch and collect the juice, and a crank turned by hand; a few sugar moulds and pots; some ivory black or animal carbon; two filters, made of common bed ticking, in the shape of an elongated pudding bag; a thermometer; Beaumé's Pèse Sirop, or saccharometer; and a polariscope. All the other utensils I obtained from the kitchen,

viz: a copper kettle of 10 gallons capacity, a ladle, some tin pans, bowls, buckets, &c., to contain the juice.

[On the 28th of September the author made his first polariscopic observation on the first joints of two canes. They yielded 69.7 per ct. of juice of sp. gr. 1.063. This, after precipitation by subacetate of lead and filtration, caused a right handed deflection indicative of 5.008 per ct. of *crystallizable* sugar in the juice; equal to 3.49 per ct. of sugar in the cane. A second observation, on juice from the next joints of the same canes, indicated 5.57 per ct. of sugar, thus showing a richer juice.]

1*st Experiment.* (Sept. 30, temp. 8 A. M. 40°, M. 60.°)—The fact of the presence of crystallizable sugar in the cane being established, I proceeded to cut and grind 20 feet of a row, and passed 30 canes which it produced three times through the rollers; about one-fourth of the seed had changed to a dark glistening brown color, but was still milky; the remainder was quite green; ground 6 to 8 of the lower joints, which together yielded 3¼ gallons of juice, weighing 9° Beaumé; neutralized the free acid by adding milk of lime; clarified with eggs, and boiled it down to 240° F.

This first experiment looked discouraging and unpromising, at every step; its product was a very dark, thick, viscid mass, apparently a caput mortuum; it stood six days without the sign of a crystal, when it was placed over a flue and kept warm for four days longer, when I found a pretty good crop of soft crystals, the whole very similar to the "Melada" obtained from Cuba, but of darker color.

2*d Experiment.* (Oct. 13th, temp. 8 A. M. 50°, M. 72°, cloudy.)—About two weeks having elapsed since the first experiment, the weather in the interim having been quite warm, temperature at 8 A. M. 40 to 52°, and at noon 66 to 75° F., and about one half of the seed being ripe, I determined to try it again; but, not being very sanguine of success, no polariscopic observation was taken.

Cut and ground 50 feet of a row, which produced 88 canes, and yielded 8 gallons of juice, weighing 10° B. (one degree more than the previous cutting), from the 6th and 7th lower joints; juice slightly acid. First clarification, 4¼ gallons, neutralized with three tablespoonfuls of milk of lime, stirred in 1 lb of

fine bone black and three eggs, and placed it over a slow fire; at 215° Fahr. took off a very dense green scum; when at 162° F. it marked 7¼ Beaumé.

A second parcel of juice from this grinding (3¼ gallons) was treated in the same manner, and set aside, both having been boiled down to 22° B.

Oct. 14, (temp. 54° to 70°) cut and ground 50 feet; 81 canes produced 7¼ galls. juice, 10° B., which was heated as above, except that the eggs were omitted.

Oct. 15, (temp. 50° to 70°) cut and ground 50 feet, produced 8¼ galls. juice, weighing 10° B.

Oct. 16, (temp. 46° to 60°) cut and ground 50 feet, 86 canes, 8¼ galls., 10° B.

The whole of the foregoing parcels were at this stage of the process concentrated to 22° B., and set aside, until I had completed the series, on the 21st of Oct.; they were then collected together, and again clarified with eggs, and a second scum taken off; they were then placed over the fire, and when at the temperature of 225° F. clear lime water, in small quantities, was added, to coagulate the vegetable albumen, which is not disengaged at a lower temperature, but which is then observed as a whitish scum, very tenacious and glutinous, and is very detrimental to crystallization. After the various delays, heatings and reheatings, consequent on my limited means of working, (the great disadvantage of which, those acquainted with the subject only can appreciate,) I commenced filtering the whole, but found it so ropy and glutinous that it would not pass through; diluted it to 10° B., when it came through tolerably bright; then passed it through 5 feet of animal black; it parted with its coloring matter very freely.

Oct. 22d. Divided the product into three parts, and boiled it as follows:

1st part to 230° F.—This stood an hour without crystallizing, found it too low, though the thumb and finger proof indicated otherwise.

2nd part to 246° F.—which was added to the first, and in a few minutes crystals began to appear.

3rd part to 238° F.—being the mean of the other two. On

finishing this, the two preceding had formed a thick opaque mass of good crystals.

Filled one mould, weight 20 lbs.—weight of mould 4¾ lbs. net weight, 15¼ lbs. Filled one mould, weight 14½ lbs.—weight of mould 4¾ lbs., net weight 10 lbs. Total weight 25¼ lbs.; and next morning set them on pots to drain; also boiled down the juice from the tops, 4¾ gallons, which produced with the scums 13½ lbs. of molasses.

Nov. 2d. Knocked out the proceeds of this experiment with the following results, viz.

1st mould yielded	sugar	7 lbs.	molasses	8¼ lbs.
2nd " "	sugar	4½ lbs.	molasses	5½ lbs.
Tops "			molasses	13½ lbs.
Total product of a row 200 ft. long,	sugar	11·50 lbs.,	molasses	27·25 lbs.
Fifty rows of cane, four feet apart, and 218 feet long constitutes an acre. Hence 200 ft. is 18 ft. less than 1–50th of an acre; therefore add pro rata		1·03 "		2·45
Products of 1-50th of an acre	sugar	12·53 lbs.,	molasses	29·70 lbs.
Which multiplied by 50 makes the product of an acre	sugar	625.50 lbs.	molasses	1485·00 lbs.

A gallon of molasses weighs 12 lbs.; therefore, 1485 lbs. equals 123¾ gallons; for the acre, 625 lbs. sugar, and 123¾ gallons molasses, produced from 18,148 canes, yielding 1,737 gallons of juice, weighing 9 lbs. per gallon, or 15,633 lbs., being 4 per cent. of sugar, and 9 per cent. of molasses, or 13·50 per cent. together.

This sugar is of a yellowish brown color, about as dry as, and about the color of, 2nd quality Cuba sugar, such as is used by refiners.

[Thus far we have given all the details, and mostly in the language of the author of these experiments. In what follows we propose as nearly as possible to give the general results in as brief a manner as possible.—ED.]

3rd Experiment, Oct. 23d, temp. 36° to 55° F. Encouraged by the favorable progress, the author decided on a more extended trial; and as the weather threatened, he had 500 feet of cane cut and stored in the barn. Nearly a month having elapsed

since the first polariscopic observation, and two weeks since last experiment, with several white frosts, and ice formed $\frac{1}{8}$ to $\frac{3}{16}$ of an inch in thickness occurring, he concluded to again examine the juice by polarized light, and was gratified to thus learn that the proportion of sugar had increased from 5·57 to 7.29 per cent. in the juice.

On the 24th, 26th, 27th, 28th, and 29th of October, each day 100 feet of canes were ground, clarified, and boiled to 15° and 18° B., and set aside till Nov. 2nd, when all but the last days' work had become a thick and liver-like mass resembling soft soap; very acid and totally ruined from not having been sufficiently evaporated. The last parcel was boiled to proof, and crystallized very well.

Mr. Lovering regrets this misfortune, less for the trouble it cost him, than from the fact that the experiment worked beautifully, and the juice being richer, the best results may justly have been anticipated. It, however, taught the danger of delay, and that the juice in the cut canes had not suffered by storage.

4th Experiment, Nov. 2d. Cut and ground 58 feet—100 canes—produced 10 gallons of juice, 10° B., less acid than preceding, neutralized with milk of lime, clarified with eggs, passed it through 3½ feet of black, and boiled to 234° F. and set to crystallize. On the 4th, 5th and 6th of Nov., the same quantity of cane was cut and ground, and otherwise treated to produce sugar and molasses, with the following results.

Product from a row of 232 ft. of canes, 19·75 lbs. sugar, 25·25 lbs. molasses.
Which at the rate of 10,900 feet to an
acre, makes the produce per acre, 928 lbs. sugar, 98·87 galls. molasses.

In this experiment, 18,277 canes yielding 1847 gallons of juice, weighing 9 lbs. per gallon, was the source of the above returns. The sugar is perfectly dry, and the process worked without the slightest difficulty at any stage.

The molasses in the preceding experiment was boiled down and crystallized so as to yield 6¼ lbs. of sugar, equal to 293·85 lbs. more of sugar per acre, thus increasing the yield of the last experiment to 1221·85 lbs. of sugar from an acre of canes. In his calculation of the residue of molasses, Mr. Lovering has inadvertedly made an error, as he merely deducts the weight of sugar produced from the gross weight of molasses subjected to

evaporation, and calls the difference the residue of molasses, without any allowance for loss by evaporation.

5th Experiment, (Nov. 9th).—This trial was intended to have been included in the preceding, but a sudden change in the weather, (ther. 74°) having induced a change in the working of the juice and its richness, Mr. L. determined to keep its results separate. It produced good sugar, but in less proportion.

6th Experiment, (Nov. 27).—The weather having been very changeable, warm Indian summer, heavy rains, and ice two inches thick, the mercury varying from 16° to 60°. To try the effects of these changes on the cane $\frac{1}{100}$th of an acre was cut, producing $11\frac{15}{16}$ gallons of juice only instead of 19 or 20 gallons, as before. The juice marked 10° B., and clarified without difficulty, yielded more scum but less sugar. This experiment proves that the sorghum will withstand the vicissitudes of the climate in a remarkable manner.

7th Experiment was the production of white loaf sugar from inferior portions of the results of the other experiments; and by the old process 24 lbs. of very indifferent sugar refined in an open kettle produced 15 lbs. of *loaf sugar*, which is a full yield for the quality.

The author acknowledges the assistance of his partner, Mr. William Morris Davis, in the polariscopic observations, and then makes the following observation in reference to his experiments: "They are, I think, sufficiently flattering in themselves to warrant renewed exertions on the part of our agriculturists, of the Northern and Middle States especially, and perhaps those of the South also, in the pursuit of this promising branch of industry, to the full and profitable development of which it is certainly capable, and which it is destined ultimately to attain." In making a comparative estimate, with the products of the cane in Louisiana, the author thinks that 10 per cent. should be added for the inefficiency of his mill, 5 per cent. for the effect of heat, and five per cent. for footings, which would raise the produce of sugar (by the 4th experiment) to 1466·22 lbs. per acre from 1847 gallons of juice. Further, statements have appeared in the papers of much larger yields of juice per acre, which, if true, will probably swell this amount considerably.

The following tabular statement of the produce of an acre of

cane in Louisiana, is derived from a minute account furnished to the author by the proprietor of a successful sugar plantation of that State. It is as follows, viz :—

LOUISIANA.

Yield of juice per acre,	2,236 gallons.
Density of juice,	8·44° Beaumé.
Yield of sugar per gallon of juice,	0·76 pounds.
Yield of sugar per acre,	1704 pounds.
Yield of molasses per acre,	102 gallons.
Wood consumed per acre,	3·87 cords.
Coal for engine,	0·41 tons.
Labor per acre,	3·70 days.

PENNSYLVANIA.

Yield of juice per acre,	1847 gallons.
Density of juice,	10° Beaumé.
Yield of sugar per gallon,	0·66 pounds.
Yield per acre,	1221·85 pounds.
" " (probable)	1612·80 pounds.
Yield of molasses, (actual*)	74·39 gallons.
" " (probable)	81·83 gallons.

The pamphlet of Mr. Lovering concludes with the following synopsis which we copy without abridgement, viz :—

1st. That it is obvious that there is a culminating point in the development of the sugar in the cane, which is the best time for sugar making. This point or season I consider to be when most if not all the seeds are ripe, and after several frosts, say when the temperature falls to 24° or 30° F.

2d. That frost, or even hard freezing, does not injure the juice nor the sugar, but that warm Indian summer weather after the frost and hard freezing, does injure them very materially, and reduces both quantity and quality.

3d. That if the cane be cut and housed, or shocked in the field when it is in its most favorable condition, it will probably keep unchanged for a long time.

4th. That when the juice is obtained, the process should proceed continously and without delay.

5th. That the clarification should be as perfect as possible by

[* This amount is probably too great; see experiment 4th.—Ed.]

the time the density reaches 15° B., the syrup having the appearance of good brandy.

6th. That although eggs were used in these small experiments, on account of their convenience, bullock's blood, if to be had is equally good, and the milk of lime alone will answer the purpose; in the latter case, however, more constant and prolonged skimming will be required to produce a perfect clarification, which is highly important.

7th. That the concentration, or boiling down after clarification, should be as rapid as possible without scorching, shallow evaporators being the best.

With these conditions secured, it is about as easy to make good sugar from the Chinese cane as to make a pot of good mush, and much easier than to make a kettle of good apple butter.

PHARMACEUTICAL NOTICES.

By William Hodgson, Jr.

On Acetic Syrups.—Every pharmaceutist in the United States may have observed the difficulty of preserving certain syrups, such as those of senega and ipecacuanha, and especially the "hive syrup," or compound syrup of squill. Many improvements have been suggested in the formula for preparing the latter, but still we are annoyed by the fact that, like the others above named, if made strong in saccharine matter, whether sugar or honey, it will assuredly crystallize with a diminution of temperature, or by long keeping; and if, on the other hand, made too weak in saccharine matter, it will as inevitably ferment, if kept during warm weather. We all know, likewise, that we have no such trouble with the syrup of squill, in any temperature, or how long soever it may be kept.

These circumstances led me, in the autumn of 1856, to prepare samples of the *Syr. Scillæ comp.* and of *Syr. Senegæ*, acidified to the same degree as the officinal syrup of squill. The samples have been kept in a warm part of my store for more than fifteen months, and now appear as fresh as when first prepared,—no sign of crystallization, or of fermentation, or mouldiness, or even of turbidity; though I have mean time repeatedly lost large portions of my *Syr. Scillæ comp. U. S.* and *Syr. Ipecac.* by crystal-

lization; and a sample of *Syr. Senegæ* made as usual, and kept from the same date, has become loaded with crystals and contaminated with "motheriness."

As some inconvenience and loss of acetic acid might arise from primarily digesting the roots in dilute acetic acid and then evaporating the acid infusion to the requisite measure by heat, I would propose to proceed exactly as the U. S. Pharmacopœia directs, in exhausting the roots, and evaporating the resulting liquid; but to carry the evaporation one-eighth further than is thus directed, and then to make up that one-eighth with the same quantity of acetic acid (*Acidum Aceticum, U. S.*, or commercial acetic acid, No. 8,) so as to bring the liquor to the acid standard of *dilute* acetic acid, before adding the sugar. Thus, where the alcoholic infusion is directed to be evaporated to half a pint, as it is in the case of *Syrupus Senegæ*, I would evaporate it, instead, to seven ounces, and then add one ounce of *Acidum Aceticum*. Or the whole exhaustion may be done by displacement with the requisite quantity of dilute acetic acid to make the prescribed measure of syrup, discarding the use of alcohol entirely, and employing the dilute acetic acid hot at first.

The syrups thus made are decidedly more agreeable than those made by the officinal formulæ, and would probably have even a more satisfactory effect as expectorants, from the well known properties of acetic acid. Yet they might, in certain cases, be supposed objectionable; and some degree of confusion might ensue in practice, by so decided a change in the mode of preparation on the part of some pharmaceutists, whilst others were adhering to the old preparations. Uniformity could scarcely be expected in such a matter, at once, throughout our wide-spread country, even in a manifest improvement. I would, therefore, propose that the syrups thus prepared should be designated as "acetic syrups,"—thus, "*Syrupus Ipecacuanhæ aceticus*," "*Syrupus Senegæ aceticus*," "*Syrupus Scillæ compositus aceticus*," &c. &c., until the benefit of the proposed alteration shall be proved by experience. I believe that some of the fruit syrups used in the soda water branch of our business would be improved by a similar acidification, both in regard to keeping through the season, and as to flavor. The addition of one fluid-ounce of

acetic acid (or even less) to the pint, for instance, of pineapple, strawberry or raspberry syrup, would be entirely preventive of fermentation, and probably render them more wholesome, as less luscious and cloying, and more grateful and refreshing in hot weather.

Ammonio-ferric Alum.—In the Am. Journ. of Pharmacy for 1856, pages 305 and 478, I made some remarks, introducing to notice the "*Ammonio-ferric Alum*," or sulphate of ammonia and of sesquioxide of iron, with a formula for its preparation. This combination having been since found by many physicians to answer the description given by Dr. W. Tyler Smith, of its advantages as an astringent tonic, the demand for it has occasioned the necessity for repeatedly preparing it; and, profiting by the suggestions of some of my friends, I have improved the process for its preparation, so as to make it much more readily, perfectly and economically, thus:

℞. Ferri sulphatis cryst. ℥xxiv.
Ammoniæ sulphatis, ℥xiss.
Acidi sulphurici, f.℥v. f.℥v.
Acidi nitrici, f.℥iij. vel q. s.
Aquæ, q. s.

Mix f.℥xxj. of the sulphuric acid, in a *large* mortar, with the sulphate of iron coarsely powdered; then gradually add, with trituration, the nitric acid, till it ceases to produce effervescence. Transfer the mixture to a porcelain capsule, and boil it with one quart of water, added in two or three portions successively. Then add the remaining f.℥iij. of sulphuric acid, and the sulphate of ammonia; boil till the latter is entirely dissolved, and set aside in a cool place to crystallize. If the resulting crystals are not sufficiently pure and violet-colored, they must be re-dissolved by boiling in about a pint of water, acidulated with an ounce or two of sulphuric acid, filtered or decanted, and again set aside to crystallize. The crystals must then be drained, and dried in bibulous paper, before being bottled up. In this way we obtain very handsome, somewhat amethystine crystals.

Tinctura Cannabis Indicæ.—It is probable that the druggists of the United States, in making this preparation, generally

adopt the proportions of the Dublin Pharmacopœia, which directs about 22 grains of the extract to the fluid-ounce. But I apprehend that very few of them have adverted to the circumstance, that the Dublin formula prescribes the "*purified* extract." The best commercial *Ext. Cannabis Ind.* appears to vary considerably in purity; hence the propriety, and indeed the necessity, of the precaution enjoined in the Dublin Pharmacopœia, to purify the extract *previously* to weighing it for solution in making the tincture. I have found that in one instance the London-made extract (from one of the first houses of that city) contained about 40 per cent. of matter insoluble in alcohol; so that if, (as I believe is generally the case,) the tincture is made from commercial extract, it contains sometimes not much more than 13 grains of *pure* extract to the ounce, instead of 22 grains, as intended by the Dublin Pharmacopœia. This circumstance may perhaps account for the frequent complaints of physicians, of disappointment in the use of the Tincture of Indian Hemp. The cost of the article, in consequence of making it with the *purified* extract, is, of course, nearly double what it would otherwise be; but this ought to be of no moment, compared with the importance of supplying a reliable article.

Lactucarium purificatum.—It is well known to pharmaceutists that great difficulty occurs in attempting to pulverize lactucarium, or to mix it uniformly with other substances, either solid or liquid, in compounding prescriptions. Rubbed into a mixture, even with extreme care and labor, its coarseness is such as to be very disagreeable to the patient, and to *look* like clumsy manipulation on the part of the druggist. This results from a certain degree of toughness, which renders it almost unmanageable, and is occasioned apparently by that portion of it which has been considered by some as allied to caoutchouc, and by others as rather of a waxy nature. This substance appears to interfere also with its efficacy as a narcotic or sedative, involving its particles, as it were, in a coat of insoluble matter. I have endeavored to remedy this inconvenience by thoroughly washing the lactucarium with chloroform, which abstracts from it two ingredients, viz., the above mentioned caoutchouc-like matter, and a very white, imperfectly crystalline or granular substance,

which is doubtless the *lactucone* of Lenoir. These are readily separated from each other by boiling in alcohol; which, dissolving the lactucone, leaves the caoutchouc-like substance behind. This is extremely tenacious and ductile, susceptible of being drawn out into very fine and long threads, like masticin; but on being heated, it successively melts, bubbles up, sends forth a white smoke smelling exceedingly like burnt caoutchouc, and loses its characteristic tenacity.

The hot alcoholic solution of the lactucone lets most of it fall in white flocculi on cooling, and the rest is obtained by slow evaporation. The best English lactucarium purified by this process lost about one-fourth of its weight, became easily reduced to an impalpable powder, and appeared to be of a more decidedly bitter taste, doubtless from its particles having become divested of their tough wrapper of *caoutchoucoid*, if we may venture on the coinage of a name for this somewhat peculiar substance.

There is some difficulty in obtaining the chloroformic liquor, after maceration, entirely clear from particles of impalpable lactucarium floating in it, and even passing with it through the filter: but this may be obviated by using the process of displacement, with a closed percolator to prevent loss by evaporation; and the chloroform may afterwards be recovered by careful distillation. I have tried ether, instead of chloroform, hoping to substitute a cheap solvent for an expensive one; but ether will not answer the purpose.

The English lactucarium appears to be considerably less loaded with these insoluble matters than the German. While the English lost about one-fourth of its weight by the above treatment, the sample of the German article lost about one-half; more than thirty per cent. being the pure caoutchouc-like matter, and about ten per cent. being the lactucone; both of them well-marked substances, but probably as devoid of the medicinal virtue of the lactucarium, as narcotine is of that of opium.

Philadelphia, 2nd mo. 12th, 1858.

REMARKS ON THE MEDICINAL HYPOPHOSPHITES.*

By William Procter, Jr.

The recent researches of Dr. Churchill into the therapeutic character and value of the hypophosphites in tuberculosis, some account of which will be found at page 143 of this number, have attracted much attention from physicians, and many inquiries have been made after these salts; and it is believed that a notice of the processes for preparing them, and some formulæ for their prescription, will be acceptable to the readers of the Journal, especially, as from their hitherto unimportant position among pharmaceutical chemicals, no mention is made of them in works most accessible. The salts which have been used are those of lime, soda, potassa and ammonia. In the sequel a notice is given of these, of the hypophosphite of sesquioxide of iron, and of hypophosphorous acid.

The hypophosphites, according to Gmelin, are mostly crystallizable. They cannot exist without a certain proportion of water, which is equally true of the acid itself, which in its most concentrated form contains three equivalents of water, one of which is replacible by bases. When heated till decomposed, these salts emit phosphuretted hydrogen. They are permanent in the air as regards oxidation; but when heated in solution, especially if free alkali is present, they are decomposed into phosphates and hydrogen gas. They are nearly all soluble in water, and several of them in alcohol, and readily reduce the soluble salts of silver and gold.

Hypophosphite of Lime is the most important of these salts, as it not only, by oxidation in the economy, will afford phosphate of lime in a nascent state, if needed, but its reactions with the carbonates of the alkalies give a ready means of obtaining the alkaline hypophosphites. When phosphorus is boiled with milk of lime it gradually disappears, with evolution of spontaneously inflammable phosphuretted hydrogen, which explodes as it reaches the atmosphere with the formation of water and phos-

* The Hypophosphites are manufactured in quantity by Hennell Stevens, of Philadelphia, who is successfully directing his attention to the supply of new chemicals for medicinal use, and fine chemicals in general.

phoric acid. When the strong odor of phosphuretted hydrogen ceases to be given off, the liquid contains, besides the excess of lime, nearly half of the phosphorus as phosphate of lime, and the remainder, deducting the considerable portion which has escaped into the air as phosphuretted hydrogen, as hypophosphite of lime. According to Wurtz, more than one equivalent of water is decomposed, and the phosphuretted hydrogen is accompanied by free hydrogen. If this be true, the source of the super oxidation of so much of the phosphorus is tracable to the resulting oxygen; but Rose is of the opinion that this oxygen is derived from the atmospheric air in contact with the boiling liquid. When the process is conducted in a flask, it requires a constant ebullition of the liquid to prevent the explosion consequent upon the entrance of the atmospheric air. To avoid this result, it has been found safer to employ a deep, open vessel. The constant evolution of gas and vapor, which keeps a froth on the surface, excludes the atmosphere in a great degree, so that the yield is not much diminished, whilst the safety and easiness of the process is greatly increased. The process should be conducted under a hood with a strong draught, or in the open air, to avoid the disagreeable fumes which are evolved.

Take of	Lime, recently burned . . .	4 lbs. av.
	Phosphorus	1 lb. "
	Water	5 gals.

Slake the lime with a gallon of the water, put the remainder in a deep boiler, and as soon as it boils add the slaked lime, and mix to a uniform milk. The phosphorus is now added, and the boiling is kept up constantly, adding hot water from time to time, so as to preserve the measure as nearly as may be, until it is all oxidized and combined, and the strong odor of the gas has disappeared. The mixture froths much, and but little of the phosphorus reaches the surface. Then filter the solution through close muslin, wash out that portion retained by the calcareous residue with water, and evaporate the filtrate till reduced to six pints. The concentrated liquid should now be re-filtered to remove a portion of carbonate of lime which has resulted from the action of the air on the lime in solution, and again evaporated till a pellicle forms, when it may be crystallized by standing in the drying room, or the heat may be continued with

stirring till the salt granulates, when it should be introduced into bottles.

Hypophosphite of lime is a white salt with a pearly margarin-like lustre, and crystallizes in flattened prisms. Its composition, according to Wurtz, is CaO,+2HO,PO, the water being essential to the salt. It is soluble in six parts of cold water, and in not much less of boiling water; it is soluble slightly in diluted alcohol, but insoluble in alcohol sp. gr. .835.

Hypophosphite of Soda is prepared by double decomposition between hypophosphite of lime and crystallized carbonate of soda.

Take of Hypophosphite of lime . . .	6 oz.
Crystallized carbonate of soda . .	10 oz.
Water, a sufficient quantity.	

Dissolve the hypophosphite in four pints of water, and the carbonate in a pint and a half, mix the solutions, pour the mixture on a filter, and lixiviate the precipitate of carbonate of lime, after draining, with water, till the filtrate measures six pints. Evaporate this liquid carefully till a pellicle forms, and then stir constantly, continuing the heat till it granulates. In this state the salt is pure enough for medical use; but if desired in crystals, treat the granulated salt with alcohol sp. gr. .835, evaporate the solution till syrupy, and set it by in a warm place to crystallize.

Hypophosphite of soda crystallizes in rectangular tables with a pearly lustre, is quite soluble in water and in ordinary alcohol, and deliquesces when exposed to the air. Its composition is NO+2HO,PO.

Hypophosphite of Potassa is prepared by the same process as that given above for the soda salt, substituting 5¾ ounces of granulated *carbonate of potassa*, in place of 10 ounces of crystallized carbonate of soda, and using half a pint instead of a pint and a half of water to dissolve it.

Hypophosphite of potassa is a white, opaque, deliquescent salt, very soluble in water and alcohol. Its greater tendency to absorb moisture renders it less eligible for prescription than the soda salt. Its composition is KO+2HO,PO.

Hypophosphite of Ammonia is prepared from hypophosphite of lime and sulphate or carbonate of ammonia.

Take of Hypophosphite of lime . . . 6 oz.
Sesqui-carbonate of ammonia (translucent) 7·23 oz.
Water, a sufficient quantity.

Dissolve the lime salt in four pints of water, and the ammonia salt in two pints of water, mix the solutions, drain the resulting carbonate of lime, and wash out the retained solution with water. The filtrate should then be evaporated carefully to dryness, then dissolved in alcohol, filtered, evaporated and crystallized.

This salt is deliquescent in the air, very soluble in alcohol and water, and when carefully heated evolves ammonia, and leaves hydrated hypophosphorus acid. The composition of this salt is NH^3+2HO,PO.

Hypophosphite of Sesquioxide of Iron.—This salt may be obtained in the form of a white gelatinous hydrate, by precipitating a solution of hypophosphite of soda or ammonia with one of sesqui-sulphate of iron. The precipitate should be well washed with water and dried at a moderate temperature. It is necessary to avoid using a hypophosphite containing any alkaline carbonate or the precipitate will be contaminated with free sesquioxide. Thus prepared, this salt is a white, amorphous, tasteless powder, like the pyrophosphate, soluble in hydrochloric acid, and in free hypophosphorous acid.

Hypophosphorous Acid.—So far as we are aware, this acid has not been employed, in a free state, by Dr. Churchill, but it is highly probable that it may come into use, should the favorable results claimed for its salts be substantiated by new observations. Any claims which phosphoric acid may possess as an agent to supply the waste of phosphorus and phosphates in the human economy, will be more than equalled by this acid. Hypophosphate of baryta is the salt which is most eligible for the preparation of this acid, but it is more convenient to prepare it from the lime salt, viz:—

Take of Hypophosphite of lime . . 480 grains.
Crystallized Oxalic acid . . 350 grains.
Distilled water . . . . 9 fluid oz.

Dissolve the hypophosphite of lime in six ounces of the water and the acid in the remainder, with the aid of heat, mix the solutions, pour the mixture on a white paper filter, and when the

liquid has passed add distilled water carefully, till it measures ten fluid ounces, and evaporate this to 8½ fluid ounces.

The solution thus prepared contains about ten per cent of terhydrated hypophosphorous acid (HO+2HO,PO) a tea-spoonful representing 6 grains of the acid, which contains 2¼ grains of phosphorus. The dose of this acid solution will probably vary from ten minims to a tea-spoonful.

It is proposed to give several forms in which the hypophosphites may be conveniently administered, and a few hints to the physician in reference to prescribing them.

The soluble salts of mercury and silver are reduced by contact with the hypophosphites. All soluble sulphates and carbonates are incompatible with the lime salt, and should not be associated with it in prescriptions, if phosphate of lime is indicated in the case. The iron salt when dissolved by excess of acid, is colored black by gallotannic acid and drugs containing it, but is not blackened by the tannin of cinchona, catechu and krameria; hence any preparation containing it may be associated with Peruvian bark. The hypophosphites of soda, potassa and ammonia, are more or less deliquescent, and when prescribed in powder it should be with proper precautions to avoid moisture, as by association with a considerable excess of sugar of milk. The lime salt may be mixed with either this sugar or ordinary sugar. None of these salts are soluble in cod-liver oil; and if given with it, they should be dissolved in syrup, and mixed by agitation. Where lactin and glycerin are indicated in the treatment of phthisis or dyspepsia, any of these salts may be very elegantly associated in the form of syrup.

Syrup of Hypophosphite of Lime.

Take of Hypophosphite of lime, an ounce.
Water, nine and a half fluid ounces.
White sugar, twelve ounces.
Fluid extract of vanilla, half a fluid ounce.

Dissolve the salt in the water, filter, add the sugar, dissolve by aid of heat and add the vanilla. The dose is from a tea-spoonful (3½ grs.) to a table-spoonful (14 grs.), according to the circumstances of the case, three times a day.

Compound Syrup of Hypophosphites.—The following formula

has been made in view of the double purpose to which these salts are directed by Dr. Churchill, viz: the increase of nerve force, and the elevation of the tone of the several functions concerned in alimentation and nutrition; and will afford an agreeable means of testing practically their merit. The iron salt is presented in a form well adapted for entering the circulation, whilst the acid, besides exerting its solvent power, adds to the agreeable taste of the preparation.

Take of Hypophosphite of lime,	256	grains,
Hypophosphite of soda,	192	"
Hypophosphite of potassa,	128	"
Hypophosphite of iron* (recently precipitated)	96	"
Hypophosphorous acid solution, q. s. or	240	"
White sugar,	12	ounces,
Extract of vanilla,	½	ounce,
Water, a sufficient quantity.		

Dissolve the salts of lime, soda and potassa in six ounces of water; put the iron salt in a mortar, and gradually add solution of hypophosphorous acid till it is dissolved; to this add the solution of the other salts, after it has been rendered slightly acidulous with the same acid, and then water, till the whole measures 9 fluid ounces. Dissolve in this the sugar, with heat, and flavor with the vanilla. Without flavoring, this syrup is not unpleasant, being slightly saline, and not at all ferruginous. Any other flavoring may be used, as orange peel, orange flower or ginger. It is also suggested to physicians that glycerin may be used, wholly or partially, in place of sugar when indicated, six ounces and a half of glycerin being substituted for twelve ounces of sugar. The object of acidulating the saline solution is to decompose any alkaline carbonates which may be present, and which have been noticed by the writer in some of the commercial soda salt. The dose of this preparation is a teaspoonful three or four times a day. A teaspoonful contains 2 grains of the lime salt, 1½ of the soda salt, 1 of the potassa salt, and ¾ of a grain of the iron salt, besides a little hypophosphorous acid.

*This quantity, 96 grains, of hypophosphite of iron is obtained when 128 grains of hypophosphite of soda dissolved in 2 ounces of water is decomposed with a slight excess of solution of persulphate of iron, and the white precipitate well washed on a filter with water.

GLEANINGS—CHEMICAL, PHARMACEUTICAL AND MEDICAL.

SANTONIN LOZENGES.—The demand for santonin has of late years largely increased, chiefly owing to its employment in making "worm lozenges." On the occasion of a recent visit to a manufacturing establishment, we were shown large quantities of European wormseed in process of preparation for making santonin. The following process is given by Wittstein: "Eight parts of coarsely powdered wormseed are digested with three parts of hydrate of lime, and 32 parts of alcohol of 40 per cent. (diluted alcohol, U. S. P.) in a copper still for one day, strained and pressed, then twice again digested with the same amount of alcohol. The mixed tinctures are distilled until the residue equals 24 parts. The latter is filtered, and the filtrate evaporated to half, acetic acid added in slight excess, and allowed to remain some days undisturbed. The crystalline mass is thrown on a funnel loosely stopped, washed with cold water, dried, boiled with ten times its weight of alcohol of 80 per cent. The solution digested some hours with animal charcoal, filtered whilst hot, and the charcoal washed with hot alcohol; the solution is allowed to crystallize, and the mother liquor evaporated to fresh crystallization. The crystals are dried and kept excluded from the light. The yield from 8 pounds of wormseed is from 2 to 2½ ounces, or from 1¼ to 2 per cent."

As santonin is soluble in volatile oils, and is associated in the wormseed with a volatile oil (ol. santonici), some European manufacturers distil the wormseed first to remove this oil, it being used like our ol. chenopodii as an anthelmintic. When the oil is not wanted, an advantage arises from subjecting the seed to a prolonged desiccation in the drying room on steam tables, to remove as much of it as possible, as it impedes the process of extracting the santonin. The dose of santonin is about ½ grains for a child. The following recipe for santonin lozenges has been published in some of the Medical Journals.

Take of Roasted chocolate nuts, in powder, an ounce,
White sugar, in powder, an ounce and a half,
Santonin, in fine powder, two drachms,
Tragacanth, in powder, a drachm and a half,
Solution of ext. of liquorice, (containing 1½ drm.) 3 fl. drm.

Make a mass with these ingredients, roll out and divide into sixty lozenges, each of which will contain two grains of santonin. They should be sprinkled with powered sugar, and placed in a position favorable for drying. By omitting the chocolate and liquorice, the lozenges will be white, and may be flavored with vanilla, or in any way most agreeable.

CHARCOAL BISCUITS.—Dr. Charles Warren, of Boston, recommends a biscuit of charcoal, each containing fifteen grains of that substance, as a palatable means of administering that substance in dyspepsia.

VACCINE VIRUS IN A FLUID STATE.—Dr. J. Hutson Ford, of Charleston, S. C., preserves vaccine virus in its normal fluid condition by drawing it into a tube open at both ends, and then closing the ends hermetically.

BI-SULPHURET OF CARBON, AS A SOLVENT FOR CUBEBS.—M. Berjot, of Caen, proposes the use of bi-sulphuret of carbon to make oleoresin of cubebs. Messrs. Garot and Schasseffele, on reporting on his paper, give the preference to ether as a menstruum for this purpose, because it requires less, and affords a better and more aromatic product. The latter mode of making the extract has been in vogue here for ten years past, and is adopted in the U. S. Pharmacopœia.

ON A MODE OF USING CHLORINE AS A DISINFECTANT.—M. Lambossy proposes to employ a mixture, analogous to that of the Edinburgh Pharmacopœia, for making chlorine water, as a source of chlorine as a disinfectant.

In a bottle holding a quart he puts two table-spoonfuls of common table salt, two tea-spoonfuls of red lead, and fills the bottle nearly full with water. Half a wine-glass full of sulphuric acid is then gradually added to the mixture, with frequent shaking. The reaction results in liberating the chlorine, which dissolves in the water. When its effects are desired, a little of the solution is poured upon a plate, the size of which should be proportioned to the need, when the chlorine is slowly evolved.

RESEARCHES ON ARSENIC.—Dr. Blondlot, of Nancy, has just observed an important fact in connection with the search after arsenic when mixed with organic matters. When substances

poisoned have been left to putrefy, some sulphuret of arsenic is formed at the expense of the sulphuretted hydrogen, and this, as is well known, escapes detection by Marsh's apparatus. Sulphuret of arsenic also forms when the suspected matters are carbonized by the action of sulphuric acid after the process of Flandin and Danger. The arsenic may be extracted by washing the carbonized mass with ammonia, which dissolves the sulphuret. Then the sulphuret may be converted into arsenic acid by the action of nitric acid, and the solution thus obtained be tested in Marsh's apparatus. (Nickles).

NEW ANTIPERIODIC.—Dr. R. S. Cauthorn, of Richmond, Va., gives an account of the root of Apocynum Cannabinum, as a powerful antiperiodic. This power of the root was discovered by an herb doctor, by the name of Ragland, and the medicine is called "Dr. Ragland's Root of Man" by the people who had used it. About six grains of the root is administered in the form of powder or pills, preceded in cases of ague by a dose of calomel. Dr. Cauthorn expresses much confidence in the virtue of the Apocynum Cannabinum, and he may be correct in his inferences; but as his own observations were only extended to six cases it may be well to get further information before admitting it to the rank claimed for it by Dr. Cauthorn, which can readily be effected, as the plant is found all over the Middle States.—*Richmond Stethoscope.*

NEW FEBRIFUGE. AZDERACH BARK.—Dr. W. R. Cornish, of the Bengal army, (*Indian Annals of Medical Science, Oct.* 1856,) states that the Margosa or Neem tree has long enjoyed a considerable reputation in India as a febrifuge, and that it belongs to the natural order Meliaceæ and genus "*Azadirachta.*" It is probably the *Melia Azederach* of our Pharmacopœia, and which under the name of Pride of India is so extensively employed as a shade and ornamental tree in the Southern States. Here the bark is used as a vermifuge. Dr. C. describes the bark as being nearly white internally and purple externally. When chewed, in its recent state, its taste is at first sweetish, followed quickly by a powerful and lasting bitter. Dr. C. employed the bark during six months with nearly all the fever patients that came under his care, in the form of decoction, (the

strength of which is not given,) from one to two wine glassfuls being administered repeatedly before the accession of the paroxysm. Dr. Cornish considers that the active principle resides more especially in the light colored inner bark, the dark exterior being highly astringent, owing to a tannin analogous to that in catechu.

CORROSIVE SUBLIMATE AND COLLODION AS AN ESCHAROTIC.—Dr. Macke uses a solution of a drachm of corrosive sublimate in an ounce of collodion as an escharotic to remove small excrescences, which it is desirable to get rid of without using the knife. It is applied by means of a camel's hair brush. When the inflammation is high, it may be abated with cold water applications without interfering with the action of the caustic, the eschar is then thrown off in from three to six days, with slight pain, and the author has not noticed absorption to take place during its contact.—*Hay's Journal.*

GELATINIZED CHLORFORM.—Dr. Massart (*Revue de Therapeutique*) gives the following process for making chloroform jelly for facilitating its use as a local anæsthetic, viz: Take equal parts of white of egg and chloroform, shake the mixture and let it stand for three hours. Or take one part of white of egg and four parts of chloroform, put them in a bottle, which is then plunged in a water bath of the temperature of from 120° to 140° Fahr., when gelatinization occurs in four minutes. This preparation is applied by rubbing the painful part, and its power of affording relief is said to be remarkable. Dr. Massart prefers the cold process. If allowed to remain long in contact with the skin, it produces incipient cauterization.—*Boston Med. Journ.*

LACTIC ACID IN VEGETABLES.—Prof. Wittstein, of Munich, has announced the presence of *lactic* acid in the peduncles of Solanum dulcamara, and in the sap of the grape vine. This acid has hitherto been considered as peculiarly of animal origin.

CAUSTIC ALKALIES DESTRUCTIVE OF CERTAIN ALKALOIDS.—Dr. Garrod, of London, in a communication to the Medico-Chirurgical Society, asserts that the caustic alkalies destroy the narcotic alkaloids in hyoscyamus, belladonna, and stramonium,

and that even in the dilute form of ten minims of liquor potassæ to the ounce of water, the peculiar properties of henbane and the other narcotics are completely neutralized. Dr. Garrod also announced that animal charcoal is an efficient antidote for the three alkaloids above mentioned. [The character of Dr. Garrod gives great weight to his remarks; yet the statement in reference to the action of potash is so extraordinary, especially in view of the usual process for making nicotina from tobacco, another of the same natural order, by distilling it with caustic potash, that we should like to see the statement confirmed by well applied experiment, to determine, 1st, whether those alkaloids are destroyed; 2d, whether a new alkaloid results as a derivative, as quinolina from quinia; and if so, 3d, whether the new product possesses active properties.—ED. AMER. JOURN. PHARM.]

AMPELOPSIS QUINQUEFOLIA, OR VIRGINIA CREEPER.—The common Ampelopsis, or Virginia Creeper, so ornamental as a deciduous climbing plant in our woods and on many walls in this city, is recommended by Dr. J. McCall as a remedy in dropsy. The bark of the vine is the part employed, and it should be gathered late in the Autumn, when the berries are fully ripe and the leaves begin to turn red and fall. It should be dried in the shade and preserved carefully from moisture. The Ampelopsis is readily known by the quinate division of the leaf. Its creeping character and frequent occurrence on the same tree with Rhus radicans, or *poison vine*, should lead the collector to avoid substituting the latter, which has a three-lobed leaf.

In its physiological effects it appears to "stimulate absorption and the elimination of matter through all of the outlets of the system rather than to act on any particular secretion, though by some it is stated to be actively diuretic."

Dr. McC. esteems the Ampelopsis a valuable addition to the materia medica; it is not unpleasant to take, though in taste it is acrid and persistent. Its infusion and decoction are quite mucilaginous.—*Memphis Journal of Medicine.*

THE SUGAR-CANE IN LOUISIANA.

By M. J. B. Avequin.

In an article published some time ago, we said that the sugar-cane is indigenous to the East Indies, China, the Kingdom of Siam, Assam, some islands in the Indian Ocean, Tanna in the New Hebrides, Tahiti, the Society Islands, and the Lieou Khieou Islands belonging to Japan.

There exist in India many varieties of the sugar-cane; some are unknown. Each of the above-named countries has produced one or many varieties which are peculiar to them. I shall, in another article, give the description of all the known varieties of the sugar-cane.

The cane called *Creole*, of Malabar and Bengal, is the first kind that was known to the western nations. It spread from India first into Arabia soon after the conquests of Alexander the Great, then into Egypt, long afterwards into Sicily, Spain, and even into Provence in France, into the Canary Islands, from there to the West Indies (the Antilles,) Brazil and the whole of South America.

The sugar-cane is now cultivated in all tropical countries, in the East Indies and South America, and in the United States, as far as 34° North latitude. There only molasses is made; the sugar does not *crystallise*. We shall not at present enter upon the consideration of that subject.

The half-civilised Indians of Peru, Brazil, Colombia, Mexico, and the whole of Central America, cultivate the sugar-cane, squeese out the juice, and ferment it to make an intoxicating drink, *Huarapa fuerte*, *la Chica*, a kind of wine which is very agreeable in hot countries. They likewise make *la Chaneaca*, a kind of raw sugar which is not separated or freed from the molasses. They also make *Raspadura*, a very close cooked sugar, which they keep in the sheath of the Indian corn ear. Here we will stop.

The sugar-cane was imported into Louisiana from Hispaniola (from St. Domingo.)

Historical Notice of the Introduction of the Sugar-cane into Louisiana.

It was in 1751, under the administration of the Marquis de

Vaudreuil, the governor of the colony of Louisiana, that the sugar-cane was first introduced into the province. On the 17th April in that year, 200 soldiers were sent from France to complete the military force in that colony. The transports touched at Hispaniola, and the Jesuits at Leogana in the Bay of Port-au-Prince, obtained permission to put on board these vessels, and send to their house at New Orleans some sugar-canes, and some negroes accustomed to their cultivation, and the manufacture of sugar. These canes were planted in the garden of the Reverend Fathers, where the first district of New Orleans now is, just beyond Canal Street, above the town, as it then existed. This cane was of the Malabar variety, from Bengal.

For the first two years after the planting, the Jesuits only thought of propagating the cane, and the endeavors which they made in the following years to extract the juice were fruitless. Nevertheless they did not despair of attaining their end.

The canes planted by the Jesuits developed well, but they did not attain to perfect maturity; the climate did not allow it. This cane was, as we have mentioned, of the Malabar variety, since named *Creole cane*. Is was, consequently, to the practically useful spirit of the Jesuits that Louisiana owes the naturalisation of the sugar-cane, which has since been the source of such immense wealth to her.

In 1754, the Jesuits tried to make sugar from their canes, but were unable to succeed; they thought that their confined space was unsuitable to it; they persevered.

From 1752 to 1758 several inhabitants of the neighborhood of New Orleans procured canes from the Jesuits, and multiplied them carefully. In 1758, a rich planter of the name of Dubreuil tried this cultivation on a large scale. He built sugar works on a plantation adjoining the lower part of the town. This property is now covered by the Faubourg Maugni, third district of New Orleans.

From 1758 to 1763, Dubreuil, notwithstanding all his care, obtained very doubtful, or rather hopeless results, in the manufacture of sugar. The Jesuits, on the other hand, succeeded no better.

In 1764, the Chevalier de Mazan, whose plantatation was on the right bank of the river, facing the town of New Orleans,

succeeded no better. In some reports, at the time, the sugar of the Chevalier de Mazan is represented as comparable to Saint Domingo raw sugar; this was evidently flattery, and encouraging falsehood. The raw sugar of Louisiana has never equalled, and will never equal in value that of the Antilles and East Indies, although it sometimes surpasses them in color; but this is in consequence of the age of the cane, and the constitution of the juice of the cane.

1765. Several other planters, among whom, was Detrehan, formerly treasurer to the king of France in this colony, formed establishments similar to that of Dubreuil, below the city on the left bank of the Mississippi. The small quantities of bad sugar which they produced, were consumed in the country. In this same year, 1765, a vessel from New Orleans, bound for a port in France, had taken a certain number of barrels of this sugar to complete the cargo; but it was of so bad a quality, and so badly manufactured, that the whole of it ran out of the barrels on the voyage. (In our own time a good deal of Louisiana sugar, if badly made, would do the same.)

At this time the judicious use of lime was unknown, as well as the proper amount of boiling, two conditions indispensable for the production of good sugar. In one word they had all *failed.*

In 1769 the manufacture of sugar was entirely given up in Louisiana. All the planters who had tried it were discouraged by their want of success. Dubreuil, the Chevalier de Mazan, Detrehan, and others, had only obtained small quantities of bad sugar. The products of the harvest did not cover the expenses of cultivation, and that of the manufacture.

At this time the trade of New Orleans consisted of timber, indigo, fur, tobacco, cotton, pitch, rice and maize. Dubreuil was the richest planter in the colony. He had above 500 slaves. He had brick-fields, indigo works, silk-worm grounds. He gathered annually from eight to ten thousand pounds weight of vegetable wax, wax from the *Myrica cerifera*, and had large plantations of these trees.

Still some individuals, gardeners perhaps, continued to grow sugar-cane in the neighborhood, and sold it in the market of New Orleans for children to suck. Others expressed the juice by means of wooden cylinders, converted it into syrup, and sold it in the town in bottles.

As we have seen, this manufacture, begun in 1765, struggling against the climate, and unfavorable seasons, was abandoned in 1769. More than 25 years elapsed before any planter ventured on a fresh trial.

In 1790, a Spaniard named Solis, at Terre-au-Bœufs, about nine or ten miles below New Orleans, was about the only one who still continued the cultivation of the sugar-cane, but it was for the purpose of converting the juice into rum. Rum was merchandise which even then had a great sale. The numerous endeavors which he made to extract the sugar had proved fruitless. This plantation, or a portion of it, now forms part of the Olivier property.

In 1791, A. Mendez, of New Orleans, bought from Solis his distillery, ground, and canes, with the firm resolution of again trying this branch of industry, and of conquering all difficulties. For this purpose Mendez employed a man named Morin, who had been for some years at Hispaniola, for the purpose of studying the cultivation of the cane, and the manufacture of syrup.

But whether Mendez had not sufficient means to carry on sugar works on the same scale as in Hispaniola, or whether he doubted of complete success, he only made some few barrels of sugar in 1791; he likewise tried to refine it, for in 1792, Mendez presented to Don Rendon, then Intendant of the province of Louisiana for Spain, some little loaves of sugar refined or bleached by him. One of these little loaves of sugar was necessary to sweeten two cups of coffee. At a great dinner which he gave in that year to the authorities of New Orleans, the Intendant Rendon showed this sugar to the guests at dessert as a product of Louisiana, manufactured by A. Mendez. Until then we find that Mendez and Morin had only made a very small quantity of sugar, as it was exhibited as a curiosity.

In 1792, Stephen Bore, whose plantation was some miles above New Orleans, finding his fortune much diminished in consequence of bad crops of indigo, determined to repair his losses by the manufacture of sugar. This enterprise was considered by all the planters as visionary, as all who had preceded him had completely failed. No one could deter him from it. Bore, who was an enterprising and active man, procured some canes

from Mendez, and planted what then was considered a large plantation. Morin, mentioned above, engaged himself to Bore, to establish sugar works on the same scale as those of Hispaniola, to produce about 1,500 pounds annually. Two years were passed in cultivation and fitting up; the third year (1795) gave encouraging results; but the year 1796 was a triumph to Bore, all difficulties were overcome, he had a crop which produced him 12,000 pounds weight. Here was a great success. This brilliant result was a great encouragement to him, redoubled his zeal, and from that moment this manufacture was acquired for Louisiana. Transported by his success, many planters hastened to establish sugar plantations. Amongst the first were Prisero, Cabaret, Reggio, and Macarthy. The following years saw many more arise, who all rapidly attained a high degree of prosperity.

At this time, about 1797, there were only two kinds of cane in Louisiana; the Malabar or Bengal cane, and the Tahiti cane. These two canes have now entirely disappeared, and are replaced by the cane with red or purple stripes, a variety indigenous to Java. This last cane has produced two sub-varieties, which we shall describe elsewhere; the one good, the other of bad quality.

We do not know precisely when the cane from Tahiti was introduced into Louisiana, but it was brought from Hispaniola towards the end of the century, in 1796 or 1797.

The cane with red or purple stripes is, as we have observed, a native of Java, and doubtless of other Eastern countries. The Dutch had found this variety of sugar-cane at Batavia, where it was cultivated; they had introduced it, about the middle of the last century, in Saint Eustache, Curacoa, Guiana, and Surinam, their possessions in America; whence this cane was spread into all the West Indian Islands, and afterwards to several parts of the Continent of America.

About 1814, or a little before, it is difficult to fix the date, an American vessel coming from Saint Eustache (Antilles), a Dutch colony, brought some parcels of these canes to Savannah, in Georgia; they were planted by a Mr. King, at some distance from the mouth of the River Savannah, on the little Isle of Saint Simon. These canes flourished, and Mr. King commenced

sugar making. In 1817, a dozen of these canes were brought from Savannah to New Orleans by J. J. Coiron, who planted them in his garden at Terre-au-Bœuf. These canes did so well that, in 1818, M. Coiron brought from Savannah a small shipload of these same canes, which were planted in his property, Saint Sophie, ten or twelve leagues below the City of New Orleans. This property has since belonged to L. Millandon and A. Lesseps. From this place have spread all the Javanese canes with red and purple stripes, which are now generally cultivated in Louisiana.

The cane with red and purple stripes, as well as the violet cane, which is merely the first degenerated, are the two best canes hitherto cultivated in Louisiana. They are canes with a hard bark, which will bear 4° or 5° of frost. Still they are not so valuable as the Tahiti variety, nor the Salangor in tropical regions. They give less juice than the Malabar, Bengal, Tanna, Tahiti and Salangor; the juice is, however, of very good quality, although a little dirty, when it has arrived at maturity. This cane has made the fortune of the Louisianians. That and its violet descendant will alone remain; none of the other kinds which I have mentioned will suit the climate of Louisiana. M. Coiron deserves to have a statue erected to his honor; he died about 25 years ago, without being aware of the immense service which he had rendered to Louisiana.—*London Chemist, Dec.* 1857, *from Journal de Pharmacie et de Chimie, Nov.*, 1857.

ON SOME FACTS CONNECTED WITH SUGAR REFINING.

By M. Bobierre.

In this work I have endeavored to ascertain the causes of the characteristic turbidness observed in some syrups during the refining process and the origin of the variations which, chiefly in summer, may be remarked in the appearance of the loaves obtained.

The impurity of the blood, the blackening of the copper pipes communicating with the filters, the perceptible disengagement of sulphurous acid produced towards the end of the operation, have led me in the first place, to examine whether the presence

of sulphur in the syrup might not be the cause of the phenomena observed. The experiments described in my note have led me to results which may be given in the following propositions.

The syrups clarified with infected blood, the albumen of which has begun to decompose, communicate to the charcoal properties which repeated revivifications render extremely evident and annoying.

Charcoal in which have accumulated compounds with a base of sulphur, injure the limpidity and color of the saccharine solution and tend to augment the quantity of molasses.

The employment of hydrochloric acid and the estimation of sulphur in the state of sulphuret of copper, enabled us to compare and judge *à priori* of the charcoals, which would give different results in manufacture, notwithstanding their apparent identity.

I come now to the examination of those means by which these serious inconveniences may be avoided. Their principles are derived from the very nature of the facts which I have just described.

Washing the charcoal with hydrochloric acid at 4° Baumé, in an apparatus in which the rotation of the solid substance would be combined with the flowing of the liquid, would decompose the sulphurets by producing a disengagement of hydrosulphuric acid. On a small scale this operation succeeds perfectly, the liquids charged with acid phosphate of lime, producing by the ulterior influence of milk of lime, a gelatinous precipitate of basic phosphate of lime, of great value in agriculture.

Washing with pure, tepid water, or water rendered slightly alkaline with carbonate of soda, will prevent the possibility of any acid remaining in the pores of the charcoal. Besides this method, which was very successful on a small scale, there is another which I would propose: namely, to eliminate as far as possible, in summer, all the revivified charcoal, that is to say, to put as much new charcoal into the filters as would be possible with a due regard to economy. This new charcoal should not be mixed with what is in the filter, but placed in the lower part of it, so that the syrup, partly freed from the coloring matter by the charcoal at the top, but still impregnated with the decom-

posed blood, may be completely purified before passing into the vessels intended to receive it.

I would observe in conclusion, that the experiments which are described in this memoir confirm what I have before announced, namely: 1st. That it is advisable to preserve the blood for refining during summer, by incorporating with it a calculated quantity of the fine charcoal intended for clarification; 2d. That the addition of small quantities of pulverised plaster sufficiently alters the new charcoal imported into France for the requirements of agriculture, and that it may thus be included in the category of manures, properly so called.—*London Chemist, December*, 1857, *from Comptes Rendus*, 1857.

CHEMICAL INVESTIGATION OF THE ESSENTIAL OIL OF CHINA ORANGES (ESSENCE DE MANDARINE.)

By S. de Luca.

The China or Mandarine orange (*Citris bigaradia sinensis* and *Citrus bigaradia myrtifolia*) grows very abundantly in certain parts of Calabria, in China, Algeria, and some European countries. The essential oil contained in the cells of the rind of the fruit does not occur in commerce, probably from the rather high price of the fruit, and it has not been examined chemically. The oil investigated by the author was prepared by expression, partly by himself, and partly by M. Anca of Palermo.

The essential oil, thus prepared, is limpid, and very fluid, and possesses a faint golden-yellow tint; its odor is very agreeable and different from those of lemon and orange; its taste is by no means disagreeable, and resembles that of orange-rind; it boils and distils exactly at 362°·4 F., leaving a very small residue, which, however, contains the minute quantity of matter which gave it its yellow color. The distilled product is colorless, and has the same odor and taste as the crude oil; it is lighter than water, its density at 50° F. being 0·852 both for the first and last portions distilled; its density, as determined previously with another sample, was 0·8517 at 53°·6 F.

It does not appear to contain any oxygenated compound; its

composition is represented by the formula $C^{20}H^{16}$. Three analyses gave,—

	I.	II.	III.		Calculated.
C	87·48	87·45	87·70	20	88·2
H	11·97	11·97	11·96	16	11·8

This essential oil is insoluble in water, to which, however, it imparts its aroma by agitation; it is soluble in about ten times its volume of alcohol, and dissolves in all proportions in sulphuret of carbon, which may be advantageously employed for its extraction; it is also soluble in ether and in crystallizable acetic acid, dissolves iodine, bromine, the resins, the oils, wax, phosphorus and sulphur, and mixes with the other essential oils.

Cold concentrated sulphuric acid gives it a red color, but this disappears on the addition of water, giving place to a yellowish tint and turbidity; the same acid, when hot, decomposes and carbonizes it with evolution of sulphurous acid. Cold nitric acid does not act upon it, or color it red, but it acquires the yellowish tint of the crude oil; the same acid, when hot, attacks it readily, with evolution of nitrous vapors, and on the addition of water, a yellow, insoluble and nearly solid matter separates.

When cold, it absorbs dry muriatic acid gas, and acquires a brown color; concentrated muriatic acid at the ordinary temperature gives it a brown color, and after two or three days' contact, gives rise to a crystallized matter of peculiar odor, the composition of which corresponds exactly with the formula $C^{20}H^{16}$, 2HCl. This compound, produced by the direct combination of the essential oil with muriatic acid, and representing the bimuriate, is solid, and forms small, transparent lamellæ, which are fusible and volatile, insoluble in water, and soluble in alcohol and ether.

Mixed with alcohol and nitric acid, the essential oil gives origin to a crystallized matter, probably the hydrate; the small quantity obtained did not allow a complete examination to be made.

This essential oil has the remarkable property of presenting the phenomenon of epipolic dispersion, discovered by Mr. Stokes, when it is looked at under certain incidences of light, exactly like the solutions of sulphate of quinine which present a characteristic blue tint upon their surface. The same coloration is presented, not only by the pure essential oil, but also by its

alcoholic, acetic, and etherial solutions, &c. The crude essential oil does not present this phenomenon, probably on account of the presence of the yellow matter.

Lastly, the oil deviates the plane of polarization to the right, and this power of deviation was always found to be =111·5, tint of passage, whence the rotary power corresponding to the red ray would be equal to 85·5. This rotary power is greater than that of the essential oils of turpentine, lemon, orange, and bergamot, which have all the same composition.

Thus this essential oil is defined by the constancy of its physical properties, density, boiling-point, and rotatory power, as well as by that of its chemical properties. It is the first known example of such homogeneity in a natural essential oil.—*Chem. Gaz., Jan.*, 1858, *from Comptes Rendus, November* 23, 1857.

ON PIPERIC ACID.

By Prof. von Babo and E. Keller.

Piperine is placed in a flask with an alcoholic solution of potash, and the flask connected with a condenser, so that the products of the action flow back into the flask, which is heated on the water-bath. (For 1 part piperine, 3 parts of hydrate of potash and 12 to 20 absolute alcohol are taken.) A decomposition of the piperine takes place, lustrous scales are formed in the brown liquid, and at the same time the characteristic odor of piperine is observed. This treatment is continued until no more crystals are formed (which for 30 grms. piperine requires about 12 hours), and the piperine is then completely decomposed. The crystals are separated from the mother-liquor by means of a linen filter. The mother-liquor contains piperidine, for by distilling it and collecting the distillate in hydrochloric acid, the hydrochlorate of that base was obtained. The residue in the retort contains substances which appear to be identical with the products of the action of potash on absolute alcohol.

The crystalline plates consist of the potash-salt of a new acid, which the authors name

Piperic Acid.—The potash-salt may be purified by repeated crystallizations and the use of animal charcoal. Or if this

method be not quite successful, the solution is neutralized by acetic acid, and a few drops of acetate of lead solution is added, which produces a feeble brownish precipitate. The solution is heated to boiling, and sulphuretted hydrogen passed through, to remove traces of lead. After filtration and concentration, the potash-salt is obtained in yellowish-white crystals. To obtain the acid, these are dissolved in water, and decomposed by either sulphuric, hydrochloric, or acetic acid, which liberate the acid in the form of a voluminous gelatinous precipitate, which is seen under the microscope to consist of extremely fine needles. The precipitate is collected on a filter, washed, and then dried *in vacuo* over sulphuric acid. On crystallization from alcohol it forms fine interwoven needles of a yellowish color which is peculiar to them.

The acid is almost insoluble in water, readily soluble in boiling absolute alcohol, from which it crystallizes on cooling. It melts at 302° and sublimes at 392° F.: a brown residue remains, and the sublimate has the odor of cumarine. The acid scarcely reddens litmus, but forms with bases well-characterized salts.

Treated with weak nitric acid, piperic acid forms an orange-colored nitro-compound. By sulphuric acid it is decomposed with formation of the violet color characteristic of piperine when similarly treated. With chlorine, iodine, and bromine substitution products are obtained, which await investigation. With pentachloride of phosphorus, it yields oxychloride and a substance which is deposited in vermilion-colored crystals.

The analysis of the acid gave—

	I.	II.	III.	IV.
C	=66·88	66·08	66·74	66·39
H	4·80	4.83	5·06	5·14
O	28·32	29·09	28·20	28.47

From these results the formulæ may be calculated:—

C	50=300	66·37	C	50=300	66·67	C	26=156	67·24
H	24 24	5·31	H	22 22	4·89	H	12 12	5·17
O	16 128	28·32	O	16 128	28·44	O	18 64	27·59

The formation of piperic acid may be expressed by the following equation:—

$$C^{70}\,H^{40}\,N^{2}\,O^{12} + 4HO = 2(C^{10}\,H^{11}\,N) + C^{50}\,H^{22}\,O^{16}$$

Piperine. Piperidine. Piperic acid.

The authors do not decide whether the acid contains 22 or 24 equivs. of hydrogen. From the large number of equivalents of hydrogen, and its small per-centage, the analyses furnish little help in the decision. Analogy with other acids renders 24 equivs. more probable, but the decomposition of piperine points rather to 22. They also consider the acid to be bibasic, on the ground that if monobasic, it would contain an uneven number of equivalents of carbon.

Piperate of soda is obtained by dissolving the acid in boiling caustic soda; on cooling, the salt is deposited as a white crystalline powder. It is so insoluble in cold water that it might serve as a test for soda.

Piperate of ammonia is formed by mixing concentrated aqueous ammonia with the acid, filtering and allowing to stand. It crystallizes in colorless brilliant plates which strongly resemble cholesterine. Exposed to the air it decomposes, ammonia is given off, and the substance becomes yellow from separation of acid.

Piperic acid forms with baryta and lime insoluble salts. It also combines with the metallic oxides to form salts which are mostly insoluble. Piperate of piperidine forms colorless lamellar crystals of splendid silken lustre. On exposure to the air, it undergoes a similar decomposition to the ammonia-salt. Piperic ether forms colorless crystalline plates. It melts at 158 to 160° F., and decomposes at a higher rate of temperature with the production of a horrible acroleine smell.

The treatment of alkaloids with alcoholic potass appears to afford an important means of arriving at their constitution. Preliminary experiments with other alkaloids, especially cinchonine, show that the decomposition is different to that by fusing them with alkalies. And, as the action is less energetic, it may be expected that the products obtained stand in simpler relation to the bodies from which they are obtained.—*Chem. Gaz., Jan.* 1, 1858, *from Journ. für Prakt. Chemie.*

ON SOME OF THE USEFUL APPLICATIONS OF THE PERMANGANATE OF POTASSA.

By G. F. Girdwood, M. D.

I had lately a distressing case of *cancer of the os uteri* under treatment: the pain was often agonising, and the discharge so offensive as to add bitterly to the sufferings of my patient, who possessed a keen sensibility. It was a case in which I felt the want of some deodorant and escharotic combined, and was induced to try the permanganate of potash. I employed it as a lotion (20 grains to the pint) injected frequently during the day, and was much pleased with the comfort given to the patient by it.

I was next induced to try it in the case of a naval officer of rank, afflicted with *cancer of the breast.* Here also the application has been most servicable. Its application as a powder, sprinkled on the sloughy mass, or as a lotion (10 grains to the ounce) to the surface of the wound, has not been attended with pain. From a gaping sore, in most offensive condition, it has occasioned the wound to assume, in some parts, a disposition to granulate. The odor of the apartment, previous to the employment of the permanganate, was so offensive as seriously to compromise the comfort of the family. This inconvenience is entirely removed

I was consulted in the spring, respecting a most *unhealthy eroding ulcer on the thigh.* It was one of those foul ulcers met with in constitutions broken down by syphilis or intemperance, and where the dyscrasis is so great as to baffle the ingenuity of the profession to restore the healthy action in the system. The permanganate was here applied as a lotion, and was most efficacious in removing the slough, cleansing the sore, and inducing healthy action.

An elderly female, long afflicted with *caries of the tibia*, which, from the offensive odor, prevented her performing the duties of her position in life with any comfort to those around her, has enjoyed perfect freedom from this annoyance ever since she has had recourse to the permanganate as an application to the leg.

[Dr. Girdwood then details cases of *scrofulo-syphilitic* and

constitutional indolent ulcers, in which he used this drug with success, and adds:—]

The foregoing statement indicates the variety of cases in which the permanganate of potash may be applied. I have used the remedy generally as a lotion; but although I have not found it necessary, for the purposes I have generally required, to use it in a stronger form, I would recommend, when it is wished to destroy masses of cancerous growth, its use in the solid form, either as a powder, as I have done, or in a mass, as the sulphate of copper or other caustics. The lotion supersedes all the charcoal, yeast, and carrot poultices: let this simple solution—make it as weak as may be thought requisite to effect the object—two to twenty grains, or more if liked—be used on a piece of lint, instead of any of these applications. The permanganate of potash is more useful than any of the other compounds of manganese and potash as a caustic or deodorant. The permanganic acid contains more oxygen than the manganic. The permanganic acid has the composition Mn^2O^7, whilst the manganic acid has a composition MnO^3.

As the escharotic action of these bodies, as well as their deodorant quality, (a quality which has been long known to chemists,) depends on the ease with which they part with the oxygen with which they abound, clearly that preparation which yields the larger quantity of oxygen must be preferable: this is the permanganic acid as permanganate of potash.

As a *deodorant*, as an *escharotic*, as a *stimulant*, it is a most useful application, combining, as it does, all these three qualities; but as a quality still to be claimed in its favor is the ease of its exhibition as a lotion applied to, or in powder sprinkled on, the sore, or as an injection. To conclude, I may say, that whilst from the foregoing relation its advantages have been attempted to be illustrated, its use is also suggested in every sort of case where it is desirable to combine all the qualities this agent so beneficially possesses; in such cases, for instance, as old chronic ulcers, warty growths, syphilitic sores, as a caustic in the primary stage, or in gonorrhœa as a stimulant injection.

I have found it a most desirable deodorant. A teaspoonful of the substance powdered, added to a tablespoonful or two of water, just enough to moisten it well, and sufficient to cover the

surface of a flat dish—a dinner plate, for example, being used for the purpose—giving a broad surface for absorption, and this plate placed under the bed, or anywhere most convenient in the sick-chamber, all odor disappears; and it has an advantage above those in general use in the sick-chamber, that it has no odor of its own. Vinegar and chlorine and nitrous acid gas, are often of themselves a nuisance; whilst destroying one odor they create another; but the permanganic acid has none. It only destroys; it does not create. I have employed the solution successfully in my stables, and in other places engendering odors. It does not require frequent change. Has it lost its original beautiful purple color? Has it become black and slimy? If so renew it, but not till then.

The permanganate of potash was introduced some time ago as a remedy in diabetes, so that it is well known to chemists.—*London Chemist, Jan.* 1858, *from London Lancet.*

ON THE PROXIMATE CAUSE AND SPECIFIC REMEDY OF TUBERCULOSIS.—Abstract of a paper laid before the Academy of Medicine of Paris, on the 21st of July, 1857.

By John Francis Churchill, M. D.

The total number of cases of phthisis treated by me amounts to thirty-five. All were in either the second or third stages of the complaint; that is, they had either softened tubercles or cavities in the lungs. Of these, nine recovered completely, the physical signs of the disease disappearing altogether in eight out of that number; eleven improved considerably, and fourteen died; one still remains under treatment.

I believe that the results, of which the preceding is a summary, taken in connection with the considerations I have set forth at length in the paper now in the hands of your Hon. Secretary, will be found to justify the following conclusions:—

The proximate cause, or at all events an essential condition of the tubercular diathesis, is the decrease in the system, of the phosphorus which it contains in an oxygenizable state.

The specific remedy of the disease consists in the use of a preparation of phosphorus, uniting the two conditions of being,

in such a state that it may be directly assimilated, and at the same time at the lowest possible degree of oxydation.

The hypophosphites of soda and lime are the combinations which hitherto seem best to fulfil these two requisites. They may be given in doses varying from ten grains to one drachm in the twenty-four hours. The highest dose which I have been in the habit of giving to adults is twenty grains.

The effect of these salts upon the tubercular diathesis is immediate, all the general symptoms of the disease disappearing with a rapidity which is really marvellous.

If the pathological deposit produced by the dyscrasy is of recent formation, if softening has only just set in and does not proceed too rapidly, the tubercles are absorbed and disappear. When the deposit has existed for a certain time, when the softening has attained a certain degree, it sometimes continues in spite of the treatment; and the issue of the disease then depends upon the anatomical condition of the local lesion, on its extent, and upon the existence or non-existence of complications. I have made numerous attempts to modify the local condition of the lungs by the inhalation of different substances, but have never obtained any satisfactory result independent of what was to be attributed to the specific treatment. The hypophosphites of soda and lime are certain prophylactics against tubercular disease.

The physiological effects which I have observed to be produced by the use of the hypophosphites of soda, lime, potash and ammonia, show these preparations to have a two-fold action. On the one hand, they increase the principle, whatever that may be, which constitutes nervous force; and on the other, they are the most powerful of hæmatogens, being infinitely superior to all medicines of that class hitherto known. They seem to possess in the highest degree all the therapeutical properties formerly attributed by different observers to phosphorus itself, without any of the danger which attends the use of that substance, and which has caused it to be almost forgotten as a medical agent. The different preparations of hypophosphorous acid will undoubtedly occupy one of the most important places in the materia medica.

The Academy resolved that the paper be referred to a com-

mittee, consisting of MM. Louis, Trousseau, and Bouilland.—*Montreal Medical Chronicle, Jan.* 1858, *from the Dublin Hospital Gazette.*

CONFECTION OF CINCHONA AS AN ANTIPERIODIC.

By D. S. Gloninger, M. D.

I would recommend to the profession the "confection of cinchona" (made of the Calisaya bark), as one of our most efficient antiperiodics, and greatly superior to the many alkaloids now in use in the treatment of intermittent fever. It sits well upon the stomach, does not produce the unpleasant cinchonism often complained of from sulph. quinia, &c., and comprises *all the powers* of the cinchona, gratefully disguised, and in such a concentrated form that the dose is *too small* even to be ungrateful to the most delicate stomach. I speak from personal experience, having labored under intermittent at least during the space of a year, the disease relapsing every third week. The alkaloids were all employed, but with no satisfactory results towards a permanent eradication of the disease. I was induced by my friend, F. L. John, pharmaceutist of this city, to use the confection, the formula of which has been kindly furnished by him, and which is appended to this article; and so beneficial did it prove that the writer has ever since used it as a substitute for all other antiperiodics, and with great satisfaction to himself and patients.

Its tonic properties will apply excellently to the convalescence from fevers, where heretofore we have used Huxham's tinct., wine of wild cherry, &c., and with this in its favor, that there is so little danger from taking "too much for the stomach's sake," so much to be deprecated in the indiscriminate use of all alcoholic tinctures.

I feel justified in saying, that if the confection receives a trial by the medical profession, and their experience corresponds with my own, that it will soon supersede all other antiperiodics now in use.

The following is the formula as furnished by F. L. John, Race st., [Philad.,] viz :—

Confectio Cinchonæ.—Cort. cinchon. calis. pulv.; confect. sennæ, *aa* ℥j; ammon. murias ʒss; syr. cort. aurant. ℥ij; m. f.

confect. Dose, the size of a shellbark, three times a day.—*American Journal of Med. Sci., January*, 1858.

ON THE VITALITY OF SEEDS TRANSPORTED BY MARINE CURRENTS.

By M. C. Martins.

Botanists, struck by the facts establishing the transport of seeds by marine currents, have thought that the latter must have played a great part in the diffusion of the disjoined species of plants which form isolated colonies upon islands or continents separated by vast extents of sea. Geologists, surprised at the uniformity of the vegetation of the great archipelagos scattered in the ancient seas, were still more disposed to consider marine currents as the principal agents in the dissemination of seeds upon the surface of the globe. These *à priori* conclusions have never been directly verified by experiment: it has never been tried (1) whether many seeds are sufficiently light to float upon salt-water; and (2) whether these seeds, after floating for a long time at the surface of the sea, still retain their germinative faculty.

To settle this question experimentally, the author selected some fresh seeds, of which the germination never fails, taking them from the principal families, and generally preferring those of large size, furnished with a hard and thick episperm, or those of littoral plants. The former should resist the action of salt-water, from their volume and the impermeability of their envelopes; the other should have more chance of germinating if they fell upon a sandy shore.

Of 98 species, 55 floated, and 39 were specifically heavier than the water of the Mediterranean, the density of which off Cette is 1.0258. Four seeds had a specific gravity equal to that of salt-water: these are *Nelumbium speciosum*, *Datura stramonium*, *Juglans nigra*, and *Gingko biloba*. Thus, of a certain number of seeds taken by chance, we may say that two-thirds float.

To try the action of sea-water upon floating seeds, the author endeavored to place them in the same physical conditions to which they would be subjected when floating at the surface of

the sea. A wrought-iron box, measuring 0.30 m. square by 0.03 m. in depth, divided into 100 equal compartments, received 98 species of seeds; each compartment contained 20 seeds of the same species. Of some large seeds there were only 6, 12, or 18, and of the small ones a large pinch was put in. The lid was then soldered on, and the walls of the box pierced with small holes, through which the water would pass easily.

The apparatus was fixed upon a buoy at the entrance to the harbor of Cette. By the rising and falling of the buoy, the box was alternately raised out and immersed in the water, so that the seeds were exposed to the action of air and water, as if they were floating on the surface of the sea. The box remained attached to the buoy from the 14th February to the 1st April, 1856, or for six weeks; 41 of the 98 species of seeds were completely rotten. The other 57 were immediately sowed in pots of turf-mould, and placed under frames. Only 35 germinated, and from these 17 must be deducted, which being heavier than salt water, could not have floated at the surface; this reduces to 18 the number of seeds which, after six weeks of floating, would be capable of germinating when placed in the most favorable circumstances. These are—*Cakile maritima*, *Nelumbium speciosum*, *Linum maritimum*, *Paliurus aculeatus*, *Cucurbita pepo*, *Eryngium maritimum*, *Scabiosa maritima*, *Xanthium macrocarpum*, *Asclepias cornuti*, *Rumex aquaticus*, *Salsola kali*, *Beta vulgaris*, *Euphorbia paralias*, *Ricinus communis*, *R. africanus*, *Gingko biloba*, *Ephedra distachya*, *Pancratium maritimum*, and *Asphodelus cerasiferus*. These are the species which, after a navigation of six weeks, would have had some chance of establishing themselves upon the shore.

Six weeks being a very short time compared with that which some seeds must occupy in their voyage from one continent to another, the author resolved to replace in the sea the 35 seeds which had germinated after six weeks' exposure; of each of these, 20 were placed in the same box, which was fastened to the buoy on the 17th June, 1856, and remained attached to it until the 18th September, that is to say, 93 days, or three months. At the end of this period, 11 seeds were rotten. The remaining 23 were sowed under frames, when 9 germinated; but from these two must be deducted, viz., *Acacia Julibrissin* and *Cana gigan-*

tea, which do not float upon sea-water. There remain, therefore, 7 species which might float upon the surface of the sea for three months without losing their germinative power, and these are only $\frac{1}{14}$th of the total number operated upon. They are, *Cucurbita pepo*, *Xanthium macrocarpum*, *Rumex aquaticus*, *Beta vulgaris*, *Ricinus communis*, *R. africanus*, and *Ephedra distachya*.

Considering the extraordinary concurrence of circumstances necessary to enable a seed thrown upon a shore to fructify and become the centre of a vegetable colony, we may conclude with Alph. de Candolle, that this mode of transport, which is so frequently referred to, can have taken only a very small part in the diffusion of the plants of the present and geological epochs; and yet the number of identical species separated by vast seas, and which marine currents alone could have transported from one continent to another, is so considerable, that the idea of the multiplicity of the centres of creation will every day acquire more probability.—*Comptes Rendus*, 24 *Aug.* 1857, *as translated in the Annals of Natural History, and Pharm. Jour.*

ON THE DRYING OF PLANTS FOR THE HERBARIUM.

By Mr. Chas. Wright.

A botanical voyager and traveller, whose explorations have extended over a large portion of the new United States' territories (New Mexico, Texas, California) into Japan, &c., and more recently into the mountain districts of Cuba, Mr. Charles Wright, whose experience consequently entitles him to attention, and whose specimens confirm the excellence of his practice, suggests improvements in the ordinary method practiced by the English botanists in drying plants for the herbarium.

He writes, in a letter from Santa Catalina de Guarsa (Cuba,) May, 1857:—

"Allow me to suggest that you alter your directions* for collecting plants in one particular, and substitute for the tin box or vasculum, one or two portfolios that will hold each four to six

*This alludes to "Directions" printed and circulated by the Royal Gardens of Kew, for the use of travellers and those herborizing in distant countries.

quires of thin, firm paper. I have tried both methods, and without wishing to arrogate to myself superior knowledge or skill, I am perfectly satisfied that one who collects with portfolios can do more and better work by one-third than he who collects with a tin box. Any person who collects a large-flowered *Convolvulus* in a tin box, and who succeeds in making even a tolerable specimen of the flower, has a greater stock of patience than I can boast of. In another particular I think your directions capable of improvement. Instead of pressing my specimens on the outside of the sheets of paper, I put my specimens *within* a sheet of paper, one or two, if large, and many, if small, *and never move them from within that sheet till they are dry.* Thus then there is no risk of breakage, which will inevitably happen in some cases during the process of drying, if they are removed from one paper to another, especially such as are resinous or milky. I have also used during the past winter a very thin paper of small size for the collection of Mosses, *Hepaticæ*, and other very small or delicate plants, and have found it very convenient. I could thus keep perfectly distinct twenty or thirty species of these little plants, besides gathering four or five quires-full of larger plants in a day's excursion; I cannot imagine how I could have done it with a vasculum. I carry, in my portfolio, a piece of thin India-rubber cloth for its protection in case of rain.

"I also employ a peculiar method for making handsome specimens of such succulent plants as *Portulacaceæ*, *Piperaceæ*, Orchids, &c., though it may be no new thing to others. As soon as possible after such plants are collected, I pass over them a hot flat-iron, thus partially scalding them; they then dry rapidly; the parts adhere together as well as any plants, and they preserve almost entirely their color; some do so perfectly. I would advise a collector, especially one going to tropical countries, to provide himself for this object with a plate of copper half an inch thick, of convenient size, round, or square, or oblong. I would prefer copper, because it retains its heat much longer than iron, and does not rust. I imagine this method might be successfully employed in drying Agarics."—*Hooker's Journal of Botany, and Pharm. Jour., Dec.* 1857.

A NEW DECOLORIZING AGENT.

M. Ch. Menè, chemist of the metallurgical establishment at Greuzot, has recently made various experiments which seem to prove that hydrated alumina may be substituted for animal charcoal for the decoloration of liquids. He prepared hydrated alumina by decomposing alum by carbonate of soda. Then filtering and washing this alumina mixed in excess with different coloring matters in ebullition, tincture of litmus or carmine, syrups, and molasses, he found it to give rise to colored *lakes*, which fall to the bottom, while the liquor becomes entirely colorless. For decolorizing the syrups of sugar, they use in the establishments large tubes of sheet iron, capable of containing from 1½ to 2 tons of animal charcoal; the liquid brought into contact with this charcoal percolates it very slowly; if the charcoal were replaced by alumina completely insoluble and tasteless, the operation of decoloration would be reduced to a simple cooking, followed by a filtering through a simple cloth. 15 grammes of alumina, replaced 250 grammes of animal charcoal in the decoloration of a quart of water, colored by 10 grammes of litmus; for a solution of sugar colored by molasses, 7 grammes of alumina were equivalent to 125 of animal charcoal. The revivification of the alumina will, moreover, be much easier than that of the charcoal.—*Comos. in Journ. Franklin Inst., Jan.*, 1858.

ORÉIDE, A NEW BRASS.

"MM. Mourier and Vallent, of Paris, have succeeded in making an alloy which imitates gold sufficiently near to merit the name *Oréide*. The properties are as follows:—pure copper 100 parts by weight; zinc 17; magnesia 6; sal-ammoniac 3·6; quick lime 1·80; tartar of commerce 9. The copper is first melted, then the magnesia, salammoniac, lime, and tartar in powder added little by little; the crucible is briskly stirred for about half an hour, so as to mix thoroughly; and then the zinc is added in small grains by throwing it on the surface, and stirring until it is entirely fused; the crucible is then covered and fusion maintained for about 35 minutes; the crucible is then uncovered,

skimmed carefully, and the alloy cast in a mould of damp sand or metal. The oréide melts at a temperature low enough to allow its application to all kinds of ornamentation; it has a fine grain, is malleable, and capable of taking the most brilliant polish; when, after a time, it becomes tarnished from oxidation, its brilliancy may be restored by a little acidulated water. If the zinc is replaced by tin, the metal will be still more brilliant."

Cosmos.

An ingot of this new *Similor* has been exhibited in the Franklin Institute, and it appears really to have the qualities which are here claimed for it, and to be well worthy of the attention of those who are engaged in ornamentation in metal.—*Ed. F. Inst. Journ.*

THE ESTIMATION OF THE WEIGHTS OF VERY SMALL PORTIONS OF MATTER.

By Alfred McMayer,

Professor of Physics and Chemistry in the University of Maryland.

The chemist, in the course of his analytical investigations, often meets with what are called traces of substances; by which is generally understood, quantities of matter too minute to have any appreciable weight in the analytical balance. Now it sometimes happens that these traces are of as much importance considered scientifically and commercially as the ingredients present in appreciable quantities; and in order to estimate these small portions of matter, he is often obliged to go over his work, using very considerable weights of substances, whereby his time and care are nearly doubled. It was this inconvenience that first induced me to try to determine in one operation the components present in large and in very minute quantities; and although I have succeeded beyond my expectations, I am confident that the process is susceptible of improvement, both as regards sensibility and accuracy.

After making many investigations on the sensibility of the most delicate levers as to small weights, this method was found far too rough. It then occurred to me that if, instead of using the opposing force of gravity through the intervention of a lever, we could oppose to the gravitating effect of the matter the force of perfect elasticity as manifested in filaments of glass, we might

succeed in obtaining the weights of extremely small parts of matter. For that purpose I tried the elasticities both of torsion and flexure, and found the latter only to answer the purpose.

The following is a description of the construction of my apparatus with which I have succeeded in estimating portions of matter equal in weight to the thousandth part of a milligram.* Heating a rod of soft glass in one spot to bright redness, I drew it out quickly, and thereby obtained a filament uniformly cylindrical, of about the diameter of fine human hair. Taking from the middle of this fine glass thread a piece of such a length (about three inches) that its weight would barely reduce it from the horizontal, one end of it was fastened by means of good sealing wax to the edge of a mahogany block, and the other end slightly hooked by approaching quickly a small spirit flame. In order to obtain a pan in which to place the substance whose weight I would estimate, I cut with the common microscopic section-cutter some disks of elder pith from ·001 to ·002 inch in thickness; and drawing out a still finer filament, the end was likewise hooked, and the other extremity being passed through a pith disk, a small knob of glass was made on this end by the spirit flame, just of sufficient size to prevent this disk slipping off the suspending rod. The filament with attached disk was now hooked on the end of the rod fixed to the block, and was then ready for graduation.

Not being able at the time to procure silver wire of sufficient fineness, I substituted some very fine and long hair, taken from the head of a child; and having brought the centre of gravity and centre of motion of a very sensitive analytical balance almost to coincide, I obtained a piece of the middle of a hair weighing exactly one-half milligram. This being divided into five equal parts (each about one inch long) gave us tenths of a milligram. One of these tenths being placed on the pithpan, the glass filament was deflected a certain quantity, which was marked on an arc formed of bristol board, and so as to be almost touched by the deflected rod in its revolution about the edge of the block. Another tenth was added and another division obtained: and so on, until all five divisions were marked, the

* [1–65000th of a grain, Troy.]

length of the divisions being about one-fourth of an inch; they were very readily subdivided into ten equal parts which gave me immediately $\frac{1}{100}$ths of a milligram. The weight of any quantity of matter less than one-half milligram may be now estimated to $\frac{1}{100}$th of a milligram by placing it on the pan and observing the deflection.

For the thousandths, still more care and patience is required, the filament being much finer and somewhat shorter, and the pith disk smaller and as thin as possible. In order to obtain the primary graduations of hundredths, one of the above pieces of hair equal to $\frac{1}{10}$th milligram is divided into ten equal parts, which gives us weights of $\frac{1}{100}$th milligram. The deflections caused by these weights, divided into ten equal parts, give $\frac{1}{1000}$ of a milligram.

As the least breath of air interferes with the graduations and weighing, the whole instrument is protected by a glass case, the end of the case next the graduated arc being on a hinge.

In elastic rods of square section, the deflection is proportional to the weight; in those of circular section this law is slightly departed from; but by the above method of ascertaining directly the value of each division, the error is avoided.

Those who may have the necessity to construct this apparatus should arm themselves beforehand with scrupulous care and unbounded patience.

From the great simplicity of the above arrangement, it seems very strange that some person did not long ago invent it; but, to my knowledge, it has never been attempted.—*American Journal of Science and Arts, January*, 1858.

ON THE EMPLOYMENT OF THE SALTS OF ALUMINA IN THE ANALYSIS OF PLANTS.

Rochleder has pointed out the superiority of alumina over hydrate of oxide of lead for the separation of the proximate constitutents of plants. The author in the first place remarks that organic substances may be divided into two classes with reference to their behaviour toward alumina. Many coloring matters, as well as other substances, are precipitated by alumina from their solutions, while others on the contrary are not affected.

Alumina therefore gives us a method of separating the one class from the other. The precipitates are less gelatinous than alumina and more easily washed out. In many cases a solution of alum may be added directly to the extract of the plant, and the alumina then precipitated in combination with the organic matter by means of ammonia. As an example of the method, an aqueous decoction of horse-chestnut bark, treated with a solution of alum and then with ammonia, gives a fawn-colored precipitate. The filtered solution is wine-yellow. The solution neutralized with acetic acid and evaporated to dryness in a water-bath gives a mass containing the sulphates of potash and ammonium, a little acetate of ammonia and all the æsculin. This may be separated by boiling with a little strong alcohol and filtering. The æsculin crystallizes on evaporation and after a single recrystallization is perfectly pure. The tannic acid, if easily separated from the fawn-colored precipitate by solution in water containing acetic acid, filtration, precipitation with a salt of lead, and decomposition of the lead salt with sulphydric acid. In conclusion the author suggests that the employment of the hydrate of alumina will permit us to prepare many substances at a cheap rate which have hitherto found no application in consequence of their high price.—*American Journal of Science and Arts, January*, 1858, *from Sitzungs berichte der k. k. Acad. zu Wien.*

ON THE COMBINATIONS OF TARTARIC ACID WITH SACCHARINE MATTERS.

By M. Berthelot.

In pursuing his investigations into the compounds formed by saccharine matters, Berthelot has been led to produce acid compounds of a peculiar nature with mannite, dulcine, and glucose. These compounds establish the constitution of a great number of natural compounds analogous to tannin, and capable, by taking up water, of splitting into glucose and a corresponding acid. In the present communication the author points out the combinations of tartaric acid with glucose, milk sugar, cane sugar, sorbine, pinite, quercite, and erythroglucine, as well as a compound of glucose and citric acid. All these bodies may be prepared and purified by the following process. Equal weights of tartaric acid and saccharine matter are mixed intimately and heated for a day

or two in an open vessel to a temperature of 120° C. The cooled mass is rubbed with a little water and carbonate of lime and filtered. The filtrate contains the lime salt of the new acid, mixed with the excess of saccharine matter; it is precipitated by twice its volume of common alcohol, and the precipitate washed with alcohol diluted with an equal volume of water. The lime salt is again dissolved in water and again precipitated as before, and these operations several times repeated. From the purified salt the acid may be separated by oxalic acid. The author represents the reactions which result in the formation of the new acids by the simplest possible formulas representing the ratio of the bodies concerned. These formulas show that, as in the case alcohol in the sulphovinates, the saccharine body minus a certain quantity of water, replaces in the acid a portion of the base necessary to saturate this acid in the isolated state. It is probable that, as in the case of the compounds of glycerine, the same sugar may form many compounds with tartaric acid. The author describes only those which he has obtained. For the formulas we must refer to the original paper.—*American Journal of Science and Arts, January*, 1858, *from Comptes Rendus.*

[*Note.*—From the above it will be seen that we owe to Berthelot the discovery of the true constitution of three entire series of organic bodies, viz., the glycerids or fatty bodies; the sugars and their congeners; and the glucosids or acid and neutral bodies which split into sugar and other acid or neutral bodies by boiling with acids, alkalies or water.—*Ed. Am. Journ. Sci. and Arts.*

RESEARCHES UPON THE INFLUENCE WHICH ASSIMILABLE NITROGEN IN MANURES EXERTS UPON THE PRODUCTION OF VEGETABLE MATTER; AND (2.) UPON THE QUANTITY OF NITRATES CONTAINED IN THE SOIL AND IN WATER OF VARIOUS KINDS. By M. Boussingault.

Several years ago Boussingault demonstrated, in the clearest way, that plants are incapable of assimilating the free nitrogen of the atmosphere. Two years ago, in a paper communicated to the French Academy of Sciences, he showed that nitrates emi-

nently favor vegetation. He now shows, by decisive experiments.

(1.) That the amount even of ternary vegetable matter produced by a plant depends absolutely upon the supply of assimilable nitrogen (ammonia and nitrates.) A plant, such as a sunflower, with a rather large seed, may grow in a soil of recently calcined brick, watered with pure water, so far as even to complete itself by a blossom; but it will only have trebled or quadrupled the amount of vegetable matter it had to begin with in the seed. In the experiments, the seeds weighing 0·107 grammes, in three months of vegetation formed plants, which when dried, weighed only 0·392 grammes,—a little more than trebling their weight. The carbon they had acquired from the decomposition of carbonic acid of the air was only 0·114 grammes; the nitrogen they had assimilated from the air in three months was only 0·0025 grammes.

(2.) Phosphate of lime, alkaline salts and earthy matters indispensable to the constitution of plants exert no appreciable action upon vegetation, except when accompanied by matters capable of furnishing assimilable nitrogen. Two plants of the same kind, grown under the same conditions as above, but with the perfectly sterile soil adequately supplied with phosphate of lime, alkali in the form of bicarbonate of potash, and silex from the ashes of grasses, resulted in only 0·498 grammes of dried vegetable matter, from seeds weighing 0·107 grammes; and had acquired only 0·0027 grammes of nitrogen beyond what was in the seeds.

(3.) But nitrate of potash furnishing assimilable nitrogen associated with phosphate of lime and silicate of potash, forms a complete manure, and suffices for the full development of vegetation. Parallel experiments with nitrate in place of bicarbonate of potash, resulted in the vigorous growth of the sunflower plants, and the formation of 21·248 grams. of organic matter, from seeds weighing as before only 0·107. This 21·111 grams. of new vegetable matter, produced in three months of vegetation, contained 8·444 of carbon derived from the carbonic acid of the air, and 0·1666 grams. of nitrogen. The 1.4 grams. of nitrate of potash supplied to the soil contained, 0·1969 grams. of nitrogen, leaving

a balance of 0·0303, nearly all of which was found unappropriated in the soil.

Finally Boussingault made a neat series of comparative experiments, introducing into calcined sand the same amount of phosphate of lime and carbonate of potash, but different proportions of nitrate of soda, or in other words of assimilable nitrogen, and watering with water free from ammonia but containing a quarter of its volume of carbonic acid. The soil divided among four pots, each having two seeds of sunflower, (*H. argophyllus* was the species used in all the experiments;) the pot

No. 1 received of nitrate of soda,		0·00	grams.
" 2	" "	0·02	"
" 3	" "	0·04	"
" 4	" "	0·16	"

The results of fifty days vegetation are given in the rate of growth, size and number of the leaves, weight of the product, &c.:

No. 1 made of new vegetable matter,		0·397	grams.
" 2	"	0·720	"
" 3	"	1·130	"
" 4	"	3·280	"

In No. 2 so little as three milligrams of assimilable nitrogen introduced into the soil enabled the plant to double the amount of organic matter. The proportion of the weight of the seeds to that of the plant formed was in

No. 1,	as	1 : 4·6 gr.
" 2,	"	1 : 7·6
" 3,	"	1 : 11·3
" 4,	"	1 : 30·8

In no case did the nitrogen acquired by the plant exceed that of the nitrate added to the soil.

In the experiments where no nitrate was added to the soil, the two or three milligrams of nitrogen acquired by the plants during three months of vegetation, came in all probability from ammoniacal vapors and nitrates existing or formed in the atmosphere. To establish their presence, Boussingault arranged an apparatus which detected the production of some nitrates. And, in exposing to the air 500 grams of calcined sand, which had 10 grams of oxalic acid mixed with it, in a glass vessel with an open

surface equal to that of one of the flower-pots used in the above experiments, the sand took 0·0013 grams. of nitrogen from the air, of which a part was certainly ammonia.

The object of the researches of which a summary is given in the second paper was, to determine the quantity of nitrates contained, at a given moment, in one *hectare* of cultivated ground, one of meadow, one of the forest-soil, and in one *metre* of river or spring water. The quantity in the soil was of course found to vary extremely with the extremes of wet or dry weather. Garden soil, highly manured every autumn, contained on the 9th of August, 1856, after fourteen dry and warm days 316·5 grams of nitre in a cubic metre of soil. On the 29th of the month, after twenty rainy days, the same quantity of the same soil contained only 13 grams of nitre. The greater part had been dissolved out of the superficial soil.

Some specimens of forest-soil, in a state of nature, furnished no indication of nitrates: others gave 0·7 and 3·27 grams of nitre to the cubic metre.

The soil of meadows and pastures afforded from 1 to 11 grams of nitre to the cubic metre. Nineteen specimens of good cultivated land gave, four of them none; others from 0·8 to 1·33; the richer ones from 10·4 to 14·4, and one fallow, of exceptional richness, as much as 108 grams. of nitre to the cubic metre. To the latter much calcareous matter had been added.

The soil of a conservatory, from which the nitrates would not be washed away by rains, contained 89, to 161, and some rather deep soil 185 grams. of nitre in the cubic metre.

The sources of the nitre are not difficult to understand when we reflect that a manured soil, especially a calcareous one, is just in the condition of an artificial nitre-bed. The ultimate result of the decomposition of ordinary manure is a residuum of alkaline and earthy salts, phosphates, and nitrates, the latter, with the ammonia furnishing the assimilable nitrogen, all-essential to productive vegetation. In incorporating with the soil undecomposed manure, instead of the ultimate results of the decomposition, less loss is suffered from prolonged rains washing out the formed nitrates.

The soluble matters washed out of the soil are to be sought in the water. River and spring waters therefore act as manure by

the silex and alkali, the organic matter, and the nitrates which they hold. The spring waters poorest in nitre of those examined contained from 0·03 to 0·14 milligrams of nitre to the *litre*; the richer ones from 11 to 14 grams. in the cubic metre.

As to river-water; the Vesle in Champagne held 12 grams., the Seine at Paris 9 grams. the cubic metre. These were the richest. The Seine at Paris carries on to the sea, in times of low water, 58,000 kilograms, in times of high water 194,000 kilograms, of nitre every twenty-four hours. What enormous amounts of nitre must be carried into the sea by the Mississippi, the Amazon, and by every great continental river; and how active, beyond all ordinary conception, must the process of nitrification be over all the land; and how vast the supply of assimilable nitrogen for the use of the vegetation!—*Ann. Sci. Naturelles, from American Journal of Science and Arts, January* 1858.

PRESENCE OF BORACIC ACID IN THE VEGETABLE KINGDOM.

By MM. Wittstein and Apoiger.

In analysing the ashes of a vermifuge of Abyssinia, the saoria or seed of the Mæsa picta, MM. Wittstein and Apoiger detected the presence of small quantities of boracic acid. Interesting as this fact may be, it does not appear extraordinary, especially since M. Malaguti detected the presence of small quantities of silver in certain organic liquids. (See *The Chemist*, February, 1850), and M. Nickles has found small quanties of fluorine in them. The process followed by MM. Wittstein and Apoiger was that of M. H. Rose, which consists, as is known, in steeping in the liquid supposed to contain boracic acid, a strip of turmeric paper, previously moistened with hydrochloric acid. By desiccation this turmeric paper acquires a tint of fine red, however little boracic acid may be present.

Moreover the presence of boracic acid in certain mineral waters comes in support of the assertion of Messrs. Wittstein and Apoiger.

To judge from what we have remarked in our researches on the diffusion of fluorine, it is to be believed that boracic acid will likewise be found in drinkable waters, and in the animal economy —*London Chemist, Jan.*, 1858, *from Annalen der Chemie und Pharmacie.*

ON THE MANUFACTURE OF ULTRAMARINE.

By J. G. Gentele.

The author has given a description of the manufacture of ultramarine, of which the following is an abstract.

The manufacture consists of two parts.

I. The preparation of green ultramarine.

II. The conversion of green ultramarine into blue.

I. *Preparation of green Ultramarine.*—The raw materials at present in use are,—

1. An alumina silicate (kaoline).
2. Calcined sulphate of soda.
3. Calcined carbonate of soda.
4. Sulphide of sodium.
5. Sulphur.
6. Charcoal or coal.

As an alumina silicate, kaoline is used, or a white clay with a similar composition. A certain admixture of lime and magnesia is not injurious, but a greater quantity of oxide of iron than 1 per cent. is objectionable. The clay is elutriated in order to separate it from mechanical impurities as much as possible. The elutriated clay is dried and ignited, and it is then easily reduced to a fine powder.

Sulphate of soda and *carbonate of soda* are obtained sufficiently pure from the chemical manufactories; both are powdered and sieved. In cases where the sulphide of sodium is obtained in the liquid form, it is evaporated in cast-iron pots, or iron pans, and the residue powdered. In using it, it is calculated as monosulphide of sodium. *Roll-sulphur* is used and is kept in stock in the form of fine powder.

Wood-charcoal or *coal* are used; of the latter, a non-caking coal, and one that leaves little ash, is preferred. Both sorts of carbon are finely powdered before being used. In preparing the mixture, it is essential not only that the substances be in the right proportions, but also that they be very intimately mixed. With dry materials the substances are weighed, then well mixed in a trough by means of a shovel and sieved, and the shoveling and sifting frequently repeated. Where solutions of sulphate of soda, carbonate of soda, and sulphide of sodium are used, the

kaoline is introduced into the solution, and the whole evaporated to dryness, the charcoal powder being added from time to time. The dried mixture is then gently ignited in a reverberatory furnace, powdered, and mixed as intimately as possible by shoveling and sifting.

The proportions in which the raw materials are used, are various in each case.

1. Soda, either as sulphate or carbonate, must be present in such quantity that half the silica of the clay may be neutralized by it.

2. There must be a sufficient quantity of soda and sulphur to form a certain quantity of bi- or polysulphuret.

3. There must be an excess of sulphur and sodium present as monosulphuret, besides the quantity which, according to the best analyses, is necessary to form green ultramarine with the silica and clay present in the mixture.

The French manufacturers use soda as soda-salt; the Germans, on the other hand, use only sulphate of soda, or a mixture of sulphate of soda, and carbonate of soda. By using sulphate, more carbon and no sulphur is required; by using carbonate of soda, less carbon and much sulphur is necessary; and hence the Germans work somewhat more cheaply than the French.

The three following mixtures may be taken as a sample:—

	I.	II.	III.
Kaoline (anhydrous)	100	100	100
Calcined sulphate of soda,	83—100	..	41
Calcined carbonate of soda,	..	100	41
Carbon	17	12	17
Sulphur	..	60	13

100 parts calcined carbonate may be replaced by 80 parts calcined sulphate; 100 parts of the latter by 60 parts dry sulphide of sodium.

The ignition is effected in crucible-formed vessels or pots, in furnaces whose construction is similar to the small porcelain furnaces, at a high and uniform temperature, and with as complete exclusion of air as possible. The mixture is placed in the pots by means of small shovels, and pressed firmly by wooden clubs. The temperature to which the pots are gradually raised is between a bright red and a white heat: the duration of a firing varies

from 7 to 10 hours; the furnace is then allowed to cool, and the contents of the crucible appear then as a caked mass of a gray or often yellowish-green appearance; it is then frequently watered. In this state the ultramarine appears as a light spongy mass, consisting of small and large porous pieces, which are ground in mills to the finest powder; the powder is then washed, and afterwards dried. After the product has been again powdered, and passed through sieves, it may be either sold as *green ultramarine*, or used for conversion into blue ultramarine.

II. The *preparation of blue Ultramarine* from green offers no difficulties. At present it is generally effected by roasting green ultramarine with sulphur at a low temperature, and under access of air, so that the sulphur may burn to a sulphuric acid. At the same time a part of the sodium oxidizes, and is then extracted from the ultramarine as a sulphate of soda. The sulphur contained in the green ultramarine remains completely behind, but combined with less sodium.

In the German roasting-process small iron cylinders are used which are built over a furnace. The posterior end of the cylinder is fixed, and is provided with a hole in which the axis of a stirrer may be placed. The anterior part may be easily taken away; it has an opening for the projecting axis of the stirrer, a small opening below, and a larger one above, which serve for adding sulphur, and which may be closed by bolts. At the upper side of the cylinder there is another small opening for the exit of sulphurous acid. The cylinder provided with the stirrer is filled with 20 to 30 pounds of green ultramarine, closed and heated in the furnace. From time to time the axis is turned in order to heat the ultramarine uniformly. When it has been heated so far that a piece of sulphur thrown into the opening of the cylinder spontaneously takes fire and burns, the fire is moderated, about a pound of sulphur is added, the stirrer is turned, and the filling-hole left open in order to allow the sulphur to burn off. The mass is turned slowly until no more sulphurous vapors escape. This treatment with sulphur is repeated until a sample exhibits the highest purity and intensity of the blue color. In some manufactories the roasting is not finished at once; but the product, before it has become quite blue, is once more washed, ground, mixed, and sieved. By this means a more uniform blue

is attained, because no lumps remain which may be greener internally than externally. After roasting again, washing, drying, and sifting, this ultamarine will be of the best quality. The brighter sorts are mostly produced by the addition of white substances.

In the French roasting-process, a sort of muffle-furnace is used, or reverberatory furnaces so constructed that the flame cannot play on the mixture. The ultramarine is spread out in a uniform layer from 1½ to 2 inches in height, and heated with the door closed until a piece of sulphur thrown in immediately begins to burn. A shovelful of powdered sulphur is then added, and the mass kept stirred with iron rakes until the sulphur is burnt off. The operation is repeated until the shade and intensity of the blue color ceases to improve.

When blue ultramarine is washed by displacement, a saturated sulphate of soda solution is obtained, which may be used in the manufactory after the iron has been precipitated by lime. Ultramarine by being burned with sulphur increases somewhat in weight, but on washing loses a small per-centage.

When the washing has been imperfectly performed, the ultramarine gradually cakes together in the casks in which it is preserved.—*Chem. Gaz. Jan.* 1, 1858, *from Dingler's Journal.*

NOTE ON THE SOLUBILITY OF METALLIC OXIDES IN COMMERCIAL AMMONIA.

By R. West Pearson.

While preparing sulphide of ammonium, I have, at various times, observed a black precipitate to be produced in the solution. The physical appearance of the deposit rendered it probable that sulphide of iron was the compound formed in this case, which assumption was confirmed upon analysis. This fact necessarily implied, that iron existed in the ammonia used, and recalled to mind a remark of Wittstein, that hydrated ferric oxide is slightly soluble in caustic potash. Schaffner, it is true, controverted this statement by referring the iron found to such as was in a finely divided state and held in suspension merely; but the initial observation of Wittstein seemed to derive sup-

port from the above noticed reaction of ammonia. In its bearings upon analytical chemistry the question also formed one of interest, so that it appeared worth while to obtain a precise answer from experiment. With this end in view, various samples of the liquor ammoniæ of commerce were quantitively treated with the annexed results:—

Experiment 1.—The sample used had a brownish hue indicative of empyreumatic matter, but was perfectly transparent and not clarified in the least by filtration. 1000 grs. were diluted five-fold with distilled water, and a stream of purified sulphide of hydrogen gas passed through. The presence of sulphide of hydrogen in the ammonia was instantly marked by the production of a dense green color. Upon continuing the stream of gas a precipitate formed, which fell completely after the lapse of several hours. The precipitate was separated by filtration, washed, dissolved in nitric acid, and the amount of iron determined by metrical use of ferrocyanide of potassium. The analysis showed 2·734 grs. of sesquioxide of iron, equivalent to 0·2734 grs. per 100 grs. of the liquor ammoniæ.

Experiment 2.—1000 grs. of liquid ammonia quite transparent and translucent also were operated on as detailed under experiment 1. The result was 1·333 grs. of sesquioxide of iron, equal to 0·1333 grs. per cent.

Experiment 3.—Experiment 1st was repeated upon 1000 grs. of a solution of ammonia remarkably limpid and free from color, when the amount of iron found equalled 1·62 grs. of sesquioxide of iron, or 0·162 per cent.

Experiment 4.—The solution had a perceptible tinge of brown, but not removed by filtration through close Swedish paper. 1000 grs. afforded 2·361 grs. of sesquioxide of iron, or 0·2361 grs. per cent.

Experiment 5.—This sample had a singular greenish hue when viewed through a considerable depth of liquid, readily suggesting the existence of copper in the ammonia. To test this, 3000 grs. of the solution were acidified by pure nitric acid and sulphide of hydrogen passed through to excess, when a scanty precipitate appeared. The amount of copper was estimated by the comparison method relating to metre analysis, *viz.*, by comparing its solution in purified ammonia with its equivalent shade in a solution of known strength. By this plan 1·104 gr. of protoxide

of copper was detected, representing 0·0368 per cent. In the filtrate from the sulphide of copper the iron was estimated as before stated; it amounted to 2·56 grs. or 0·0853 per cent.

Experiment 6.—A sixth sample of ammonia examined like No. 5, gave no proof of the presence of copper, but showed the sesquioxide of iron to equal 0·97 grs. per 1000 grs. or 0·097 p.c.

The above cited experiments show that the solvent property of commercial ammonia is not confined to, though greater in, those specimens perceptibly colored by foreign matter. I believe, however, that the solubility of sesquioxide of iron is in all cases due to such extraneous matter, which may vary in quality as well as quantity. That such is the correct view of the matter is substantiated by the following experimental results:—

(*a*) Ammonia, prepared chemically pure, was poured to a liberal excess into a solution of sesquichloride of iron, and the mixture allowed to stand about twelve hours. After this, the precipitated oxide was removed by quick filtration, and 1000 grs. of the solution treated for iron with sulphide of hydrogen. Not the slightest change was affected. Evidently, therefore, absolutely pure ammonia may be safely used for the precipitation of iron.

(*b*) The last experiment was repeated, and the solution separated and tested without delay, but without detecting a trace of dissolved iron.

It may therefore be inferred, that the iron dissolved is due, not to the action of ammonia, but to impurities mixed with it, and that the latter are of an organic nature. The influence of organic substances in effecting solution and otherwise masking chemical reactions is by no means new. That the fact deserves prominence in connection with the use of ammonia as a precipitant in analysis is borne out by the following cases.

(A) The ammonia employed in experiment 1st was used to precipitate sesquichloride of iron, and the mixture set apart for about six hours. When the decanted solution was tested for iron, the amount indicated was 0·89 per centage. The solution of this amount of sesquioxide of iron must be attributed to the excess of organic matter present.

(B) To a solution of alumina in hydrochloric acid was added a slight excess of the ammonia examined in experiment 2nd; the

mixture warmed and filtered. The filtrate, still containing excess of ammonia, was acidified and evaporated to dryness, and calcined to expel organic matter. The residue, after fusion with a little pure carbonate of potash, was dissolved in hydrochloric acid and alumina reprecipitated by ammonia free from organic impurity. On determining its amount by weight it yielded 0·31 gr. of alumina. About 4 grs. of alumina were precipitated in the first stage. Hence, any results got by the use of ammonia from which organic matter, at least, has not been removed, are apt to be vitiated and not to be relied upon.—*London Chemist, December*, 1857.

ON THE RED COLORING MATTER OF THE FEATHERS OF CALURUS AURICEPS.

By M. An. Bogdonow, of Moscow.

The attention of ornithologists has been of late years much directed to two questions of the greatest importance and interest in the science of birds: the cause of the coloration of the feathers, the absence of color on the one hand, and on the other, the influence of external agents on the coloration of beings, the stability of varieties, and their signification in classification. The last question is evidently closely allied to the first.

Having found that chemical works contained nothing relative to the coloring matter of feathers we resolved to seek for it ourselves. Fortunately, our studies on the chemical characters of the horny substance and the action of different chemical agents on this substance gave us a means of extracting and isolating the coloring matter, although this means only enabled us to succeed with certain colors. This process forms the subject of the present article.

The horny substance forming the base of the feather is soluble only in caustic potassa, sulphuric acid, and Papin's digester; it swells in acetic acid, and water; alcohol and ether have no influence on it. By modifying the effects of these agents on feathers of various colors and constitutions, we for a long time obtained no result, until, amongst these combinations, we put red feathers into boiling alcohol. Our process of isolating the red

matter of the feathers of the *Calurus auriceps* is based on the fact that alcohol does not react on the horny substance, but dissolves the coloring matter.

If the feathers of the *Calurus auriceps* are carefully cut, put into a capsule containing alcohol, and boiled on a sand bath, after a quarter of an hour we find that the feathers become paler, and the alcohol assumes an orange-red color. By prolonging the boiling and renewing the alcohol, the feathers become at length quite colorless, and there is a solution of the pigment. After filtering the latter, it is evaporated on the sand bath, always taking care not to raise the temperature to that of boiling water, but keeping it at about 60° or 70° C. (108° and 120° F.), and we collect in the capsule a powder which, in the mass, is a deep red, and in the particles orange red. By pouring water on the residue all is dissolved, except the pigment, which is thus obtained pure.

This is an orange red powder, which in the river is of a deep red; consequently this same matter may produce all the tints from the pale orange of the *Rupicola aurantia* and the crest of the golden pheasant to the deep red of its abdomen and the color of the *calmus*. The red pigment is insoluble in water, whether cold or hot, and is attacked by light. As this appears to be a matter which was hitherto unknown, I propose to call it *zooxanthine*.

Hot alcohol likewise acts on the pale violet feathers of the *Catingua cærulea*. A solution is obtained which is nearly of the same color as with the red feathers. The violet pigment can only be isolated of the orange red color, only sometimes with the violet tint. By treating these feathers with acetic acid we likewise obtain a red solution, but it is completely decolored in three hours; on the contrary, the solution obtained with alcohol and evaporated keeps perfectly, as well as the residue of the solution of the orange red feathers. This is a fact analogous to those remarked in lobsters: on removing the colored membrane, the violet pigment instantly becomes changed to red. The changes of color produced by chemical agents and light appear to prove the identity of the violet pigment in birds and lobsters. If this is the fact, it gives us reason to believe that there is only one pigment for one color throughout the animal series. I mean

to endeavor to decide this point, or at least to try and make some advance towards a decision.

On treating greenish yellow feathers with hot acetic acid, we obtain a solution of the same color, only a little paler. By evaporating it, and then treating it with alcohol, we have likewise a solution of the same color. Is this solution of the pigment *zooverdine?* I am not quite sure of this, as the color is not decisive.

A pale yellow solution is likewise obtained by treating the feathers of the *Ariolus galbula* with acetic acid; but this solution loses color rapidly, and I have not been able as yet to isolate the *zoofulvine.—London Chemist, December*, 1857, *from Comptes Rendus.*

ON THE PREPARATION OF IODIDE OF CALOMEL (IODURE DE CHLORURE MERCUREUX.)

By M. Gobley.

The chemical compound called iodide of calomel, discovered in 1847, by M. Boutigny, was prepared by mixing protochloride of mercy and iodine in the relation of one equivalent of iodine and two equivalents of the proto-chloride, and it consists of a mixture of calomel with biniodide and bichloride of mercury. It is consequently less active than the two latter salts, but more active than the protiodide and the protochloride, and is very much celebrated in the treatment of certain affections of the skin, particularly in acne rosacea. M. Gobley endeavors to render the process of M. Boutigny more practical and more easy of applicatien. He takes iodine reduced to powder in a mortar, and mixes it with calomel, and then introduces the mixture into a small glass retort. This is then placed upon a sand bath, and some moments afterwards the mass is seen to assume at first a greenish tint, and then enter into fusion. The retort is withdrawn, and the mass soon solidifies; it is at first greenish, then in the air becomes gradually red, and at last it remains so. The iodide of calomel is employed in pills and as a pommade; the former are prepared by mixing it altogether with gum arabic, crumb of bread, and orange-flower water; the latter is made by mixing it in powder with lard.

M. Bouchardat has lately announced that there are two iodides of calomel—one which may be called a protiodide, and the other a biniodide; and M. Perrens has proposed to prepare the two iodides, differing from one another not only in their physico-chemical character, but also very probably in their therapeutical action. They are prepared in the same manner, except that one compound is formed with half the quantity of calomel which is employed for the other.—*British and Foreign Med. Chir. Review, Jan.* 1858, *from Bul. Gén. de Thérap., Sept.* 15*th*, 1857.

NOTES UPON AMYLENE.

By Dr. Adolf Schauenstein.

Immediately after the first experiments which were made in Vienna with the new anæsthetic material, amylene, Dr. Schauenstein obtained for examination some of the preparations employed, both of Parisian and Viennese manufacture. They all appeared to be mixtures of solutions having different boiling points, and the greater part of the solutions was volatile at 100°. The most volatile part of the distilled liquid presented a smell resembling chloroform, so that it seemed necessary to examine this pretended amylene for some proportion of chlorine. This experiment is performed in the following manner. The solution to be examined is mixed with about an equal volume of potash or soda ley free from chlorine, and a few drops of solution of nitrate of silver, and then heated with continual stirring up to the boiling point, in which operation the greatest care is taken that too sudden an evaporation does not occur to the solution to be examined. If now so much nitric acid, free from chlorine, is added that the separated oxide of silver again comes into solution, then there remains (in case the fluid examined contains chlorine) the chloride of silver, in its well known white flocculi, as an insoluble residue. A great number of organic combinations containing chlorine, in which this element cannot be discovered directly by solution of silver, may in this manner be quickly and conveniently tested. The specimens of amylene examined in this manner by Dr. Schauenstein all showed the presence of chlorine. The presumption, therefore, formerly existed that the amylene found in commerce was purposely mixed with chloro-

form, and it was possible, by referring to this addition, to explain the narcotic operation now and then observed, until there was exhibited an equal, or indeed a greater, proportion of chlorine in a boiling product of distillation prepared according to Balard's direction, than had been formerly found in the commercial article. The necessity now presented itself of obtaining positive conclusions upon the proportion of chlorine existing in amylene. Some amylene was freshly prepared, with especial care that all impurity from chlorine should be excluded. The chloride of zinc employed in the process was treated for several hours at 160°, and after cooling was brought to the test of ammonia, in order to discover by this means the accidental presence of free hydrochloric acid; but it was quite free from this acid. The amylene collected from every part of the product of distillation, which is volatile below the boiling point of water, was left to stand for twenty-four hours, frequently stirring with some fragments of caustic alkali broken into a coarse powder, and then rectified. Immediately this purified amylene exhibited a large proportion of chlorine.

The investigation of the commercial article had shown that no pure amylene, but only a volatile mixture containing chlorine compounds, had hitherto fallen into the hands of medical men; and the circumstance that even in amylene prepared with so much care such a large proportion of chlorine is discovered, leads to the conclusion that in the method recommended by Balard, by distillation of amyl-alcohol with chloride of zinc, no pure amylene can be obtained. What remains upon the medicinal application of a preparation which shows itself to be a mixture of bodies difficult to separate from one another, and the purity of which cannot be tested, requires no further discussion; and as long as no method is discovered for the preparation of actually pure amylene, and as long as no actual amylene is employed for experiments, all further trials with this body must be wanting in the most necessary foundation of a scientific experiment—namely, sound logic.—*British and Foreign Med. Chir. Review, Jan.* 1858, *from Woch. der Gesell., der Arezt zu Wien, June 22nd*, 1587.

ON THE OLEANDER (NERIUM OLEANDER).

By M. Latour.

In traversing the valleys of Catalonia and Valencia we are struck with the vigorous vegetation of these beautiful countries; the rivers are bordered with the oleander, which grows spontaneously, and is easily propagated; this shrub is abundant in Algeria, and is cultivated in France as an ornament to the garden; its poisonous properties have been long known, and works on toxicology mention the case of the poisoning of a body of troops under Marshal Suchet, when many died after a meal of meat cooked and skewered with branches of the oleander.

The cherry laurel, which is likewise poisonous, is employed in Paris, in conjunction with the rose oleander, to ornament butcher's meat. In a note, which I have addressed to the Prefect of Police, I have denounced this dangerous custom, which I trust will be discontinued.

M. Latour has made many most careful investigations, for the purpose of isolating the active principle of the oleander; he operated on that of Algeria, which is distinguished by its milk-white juice, a characteristic which is not found in that cultivated in France.

Although from time to time endeavors have been made to use preparations of the oleander in therapeutics, it is now quite abandoned; as a poison, two kinds of accidents have been described; those produced by swallowing the soluble principles; and those produced by remaining for some time under the branches of this shrub.

This last kind of accident is in admissible, for the oleander possesses no volatile principles. M. Latour's experiments show that the leaves of the oleander contain; 1st, wax and a green fatty matter; 2nd, chlorophylle; 3rd, a neutral, white, crystallisable resin; 4th, an acrid yellow resin, electro-negative (this is the poisonous principle;) 5th, tannin; 6th, a small quantity of uncrystallisable sugar; 7th, albumen; cellulose; 9th, salts, chlorides, sulphates, and acetates, of potassa, lime, and magnesia.

On distilling the fresh and dry leaves of the oleander with water, M. Latour ascertained that a portion of the acrid resin

came over, held in solution by other principles, and that the alkaline and earthy chlorides favored this division.

On subjecting the bark to the action of water, alcohol, and ether, M. Latour found that the acrid yellow resin that it contained was identical with that of the leaves, and that it resided chiefly in the white cortical part (liber;) the flowers likewise contain this yellow resinous matter; they also contain a yellow, odorous, adhesive, fatty matter, of a soft consistence, which appears to be a mixture of fatty oil and caoutchouc; a thick fatty paste, soluble in alcohol and ether, saponifiable by alkalies; a red coloring matter, insoluble in ether, soluble in alcohol and water, possessing the characters of tannin; finally, tannin combined with a very acid yellow coloring matter, gallic acid, uncrystallisable sugar, albumen and pectine.

One observation made by M. Latour deserves special mention; he has found that the proportion of the poisonous acrid resin is more abundant in the oleander when growing wild than when cultivated.

After making a most profound study of the coloring matter of the flowers and ascertaining its presence in the bark, M. Latour thus sums up his interesting researches on this plant.

1st. The poisonous principle of the oleander exists in the leaf, the bark, and the flowers, but in unequal proportions; the bark contains the largest quantity, the leaf and the flowers about equal proportions.

2nd. The poisonous principle is of a resinous nature, not volatile, showing itself under two modifications. With regard to its solubility in ether, this modification is more apparent than real, and may be the result of the presence of a foreign principle.

3rd. The solubility of this resin is singularly facilitated by the alkaline salts; for this reason the aqueous extracts of the leaves and flowers, which contain a larger proportion of these salts, are more active than the aqueous extract of the bark; but the inverse is the case with the alcoholic extracts; that of the bark shows nearly double the activity of that of the corresponding extracts of the flower and leaf.

4th. The distilled waters obtained with the bark and the leaf, possess an activity which, when carefully studied, might become useful in therapeutics; it is entirely due to the resin carried over

by the steam, and kept in solution in a peculiar state, analogous to that of essences.—*Chemist, Jan.* 1858, *from Jour. de Pharm., Nov.* 1857.

ON THE PREPARATION OF MANGANESE.

By C. Brunner.

In continuing his experiments on the reduction of manganese, the author has made some further observations, which he publishes as a supplement to his previous memoirs.

He first describes the preparation of protochloride of manganese. When this can be obtained as a residue of manufacture, of course such crude solutions of protochloride of manganese may be made use of directly. Otherwise it is prepared as follows:

Powdered black oxide of manganese, moistened with a very small quantity of water, is calcined in an earthen crucible. The residue, when cold, is treated in a retort with three times its weight of common muriatic acid, and the mixture is digested gently for 24 hours. It is then evaporated to dryness in an earthen capsule; the brown saline mass obtained is broken up, and roasted at a bare red heat, during which operation it is frequently stirred with an iron spatula.

The gray powder thus obtained is then extracted with water. The pale rose-colored solution produced contains no trace of iron, but retains some zinc and cobalt; the presence of the latter is shown by the fact, that a small portion, when evaporated in a porcelain capsule, acquires a bluish color immediately before it becomes perfectly dry.

To get rid of these impurities some acetate of soda is added to the solution, which is then treated with sulphuretted hydrogen gas. A precipitate is formed, which is at first dingy white, and afterwards becomes brownish; by the aid of heat this separates more completely and falls to the bottom in black flakes. A filtered portion of the fluid is then again tested for cobalt by evaporation. If a bluish color still occurs, the addition of acetate of soda and the treatment with sulphuretted hydrogen must be repeated.

If cobalt be no longer shown by testing, the fluid is examined for sulphuric acid; and if this be present, it is thrown down by

chloride of barium. This is necessary, as otherwise in the reduction the metal might contain a small amount of sulphur. The solution filtered from the precipitate of baryta is then evaporated to dryness, and the pale rose-colored salt thus obtained is fused in a crucible; this takes place at about the melting-point of chloride of calcium. Too strong a heat must be avoided, as otherwise a portion is volatilized, or perhaps partially decomposed.

The fused saline mass is poured out upon a plate of stone or metal, and immediately after cooling pounded into a coarse powder and preserved in well-stoppered bottles, as it attracts moisture very readily.

To reduce the metal, the protochloride of manganese thus prepared is mixed with an equal weight of pounded fluor-spar by agitation in a flask, and divided into portions of about 15 grms. each placed in a small corked bottle. Into each bottle about 3 grms. of sodium freed from adherent naphtha is put, in fragments of the size of a pea.

A Hessian crucible is then heated to a slight red heat, and the contents of the bottles are thrown into it one by one. After each addition the crucible is lightly covered, and the next portion is not thrown in until the reduction, which takes place with noise and flame, is completed.

When a crucible capable of containing 4 ounces of water is employed, and 10 to 12 portions have been thrown into it, the mass is covered for more certainty with about 1 ounce of fused and coarsely pounded chloride of sodium. The fire is then strengthened by blowing so as to give a moderate white heat, that is to say about the temperature required for the fusion of cast iron. This is continued for 10 minutes.

The crucible is then allowed to cool slowly, and on breaking it the metal is found at the bottom of the crucible, beneath the slag, in the form of a perfectly fused, roundish regulus.

Although the author has effected all his reductions with the quantities above described, there is no doubt that the same process may also be employed on a larger scale.

The quantity of metal obtained is indeed not what might be expected from calculation, nor is it always the same. In such operations it is, of course, impossible to prevent a considerable

portion of the sodium from being partly evaporated and partly burnt by the heat of reduction. With a little practice, however, the maximum that is to be obtained, may be reached. From the author's observations, he values this at 65 against 100 of sodium employed.

To combine small fragments of manganese into larger masses, or to work up imperfectly reduced specimens, the following is the best mode of proceeding:—

The metal is pounded in a steel mortar into a coarse powder, this is mixed with twice its volume of anhydrous chloride of sodium, and exposed to a white heat for 10 minutes in an earthen crucible.

A refusion of this kind is always advisable. Metal which has not been fused a second time acquires small spots on its surface when polished and kept for a considerable time, and these appear to be due to impurities. By a second fusion the latter pass into the slag.—*Chem. Gaz., Jan.* 1, 1858, *from Dingler's Polytechn. Journ.*

Varieties.

Scientific Mission to India.—An important paper has just been read to the Academy of Sciences on a mission sent to India and Upper Asia in 1854 by the King of Prussia and the East India Company. The members of the mission consisted of three brothers, MM. Herrmann, Adolphus, and Robert Schlagentweit, two of whom, MM. Herrmann and Robert, returned in June last; the third, M. Adolphus, is still among the Himalaya mountains, and is expected soon to return, *viâ* the Punjab and Bombay. During the winter of 1854–55, these enterprising travellers visited the regions lying between Bombay and Madras; in the following summer M. Herrmann explored the eastern parts of the Himalaya, the Sikkim, Bhootan, and Kossia mountains, where he measured the altitudes of several peaks. The highest of all the summits known throughout the world, appears by his measurements, to be the Gahoorishanka, situated in the eastern portion of Nepaul—the same announced as such by Colonel Waugh, but called by him Mount Everest, because he had been unable to ascertain its real name in the plains of Hindostan, where he effacted his measurement. This peak is somewhat more than 29,000 English feet in height, and bears another name in Thibet, Chingopamari. The other two brothers, MM. Adolphus and Robert, pene-

trated by different roads, into the central parts of the Himalaya, Kumaon, and Gurwahl; they then visited Thibet in disguise, entered the great commercial station of Gartok, explored the environs of Lake Mansarowr, and that remarkable crest which separates the waters of the Indus from those of the Dihong, often erroneously called the Burrampooter. They ascended the Ibi-Gamine, 23,260 feet in height, that being an altitude never before attained in any part of the world. After having been separated from each other for a space of fourteen months, during which M. Robert ascertained that the table-land of Amarkantak, in Central India, which is generally stated to be 8000 feet above the level of the sea, is not more than 3300 in height, the three brothers met again at Simla, previous to commencing the operations intended for the summer of 1856. M. Adolphus, on leaving that place, crossed the Himalaya, when over Thibet, Baltistan, and visited the interesting spot where several mountain crests meet, and the Hindoo Koosh joins the range lying to the north of India. He then returned to the Punjab through the valley of Cashmere. MM. Herrmann and Robert proceeded to Ladak by different routes. Under good disguises, they were enabled to penetrate in Turkistan proper by crossing the Karakaroom and the Kuenluen mountains, and descending into the great valley of Yarkand, a region never visited before, not even by Marco Polo. It is a vast depression of between 3000 and 4000 feet, separating the Kuenluen on the northern frontier of India from the Syan-Chane, or mountains of Central Asia, on the southern border of Russia. They then returned to Ladak, and entered the Punjab by different routes through Cashmere. After a two years' negotiation, M. Herrmann was, at the commencement of 1857, admitted into Nepaul, where he determined the altitudes of the Machipoora and Mount Yassa, which have hitherto been vaguely called the Dhawalagery, which means nothing else but "snowy crests," and is applicable to all snow-capped mountains. M. Robert proceeded to Bombay through Scinde, Kutch, and Guzerat; where he surveyed the chain called the Salt Range, and determined the changes effected in the course of centuries in the course of several rivers. Before returning to Europe, he stayed three months in Ceylon. M. Adolphus visited various parts of the Punjab and Cabul previous to returning to the Himalaya, where he still is. The chief results obtained from this careful exploration of Asia are the following:—The Himalaya mountains everywhere exercise a decided influence over all the elements of the magnetic force; the declination everywhere presents a slight deviation, causing the needle to converge towards the central part of that enormous mass, and the magnetic intensity is greater than it would be anywhere else under an equal latitude. In the south of India the increase of magnetic intensity from south to north is extremely rapid. The lines of equal magnetic intensity have a remarkable form, similar and perhaps parallel to those of certain groups of isothermal lines. The three travellers have collected all the materials necessary to ascertain this important fact. Irregular

local variations in terrestrial magnetism are rare in those regions. In the Deccan and Behar the rocks are magnetic. On the Himalaya, at altitudes of 17,000 and even 20,000 feet, the daily *maximum* and *minimum* variations of the barometer occurred nearly about the same hours as in the plains below. Again, at the above altitude, the inversion of the curves of daily variation which is met with on the Alps does not take place. At the altitude of 17,000 feet the diminution of transparency produced by a stratum of air of the thickness of 3000 feet is no longer distinguishable by the eye. During the dust storms which frequently occur in India the disk of the sun is seen of a blue color; if small bodies are made to project their shadows on a white surface under such circumstances, the shadow is of an orange color—that is, complementary to blue. The transparency of the waters of the Ganges, the Burrampooter, and the Indus was tested by letting down a stone into them, which generally became invisible at a depth of from 12 to 15 centimetres (5 to 6 inches,) showing that they are overcharged with earthy particles, for in the sea near Corfu a stone is visible to the depth of 50 feet, and in the seas under the tropics it remains visible at a depth of 30 feet.—*London Pharm. Journ., December* 1, 1857, *from London Times, October* 23.

German Laboratories.—We extract from an exchange, the following account of foreign Chemical Laboratories:

"The German Laboratories offer, certainly, very superior advantages to all who choose to be diligent; and one can stay with profit at almost any of them; but it is best for the student to spend some time in more than one. As it is a feature of German character to investigate particular branches, so the different laboratories vary according to the *forte* of their professors.

"For *Analytic Inorganic Chemistry*, the laboratory of Rose, of Berlin, has the highest reputation, but then he takes but one or two students and these places are generally engaged beforehand. They have been filled by American students for some time.

"For *Analytic Organic Chemistry*, of course Liebig's laboratory, in Munich, stands the highest. He takes about six students, and his laboratory arrangements are fine. It is not easy to get a place there, but an American can generally succeed. His charges are (I think) 64 florins ($24) per half year, and 20 florins ($8) more for his lectures.

"For various kinds of *Mineral Analysis*, as that of the silicates, for all kinds of gas determinations, and for general chemistry, the laboratory in Heidelburg, under Prof. Bunsen, stands decidedly at the head.

"Prof. Bunsen is the best gas analyst in the world, and his lectures on general chemistry are said to be as good as any delivered in Germany. The Professor is a most capital fellow. The laboratory is new and the best in Germany. It accommodates fifty students, and has been filled for the

last year, but Americans can easily get places. Charges, 46 florins ($18.40) for laboratory, and 20 florins ($8) for lectures.

"For making chemical preparations, and the general study of organic chemistry, Prof. Wohler, of Gottingen, is, perhaps, the best. More Americans study with him than at any other laboratory in Europe, and I have heard him praised by all; but his laboratory is not so well arranged as some others. It is no place to study inorganic chemical analysis.

"For beginners, and those at work on *qualitative* analysis, the laboratory of Prof. Fresenius, at Wiesbaden, is very good, although for advanced students it is inferior to either of the two mentioned before it—Bunsen's and Wohler's. I have known some who have studied there, and they were pleased. I visited it but a few days ago. The arrangements are very good; charges were about the same as those of Heidelburg, I think, but cannot speak positively.

"The laboratory of Prof. Erdman, in Leipsic, is a very good one, and I know several Americans who have studied there. They were pleased, on the whole, but still hardly recommended the place; charges less than those mentioned; many lectures are free.

"These are the principal *German* laboratories, and for most purposes I would decidedly recommend those of Bunsen and Wohler as standing at the head, giving Bunsen the preference, as I think him the most philosophical chemist of the day.

"As near as I can ascertain, the laboratories of Paris are not as good for work as those of Germany, but one may hear good lectures in the winter. I forgot to say that Bunsen's lectures are on General Inorganic Chemistry, there being two similar courses each year. Liebig's lectures are on Inorganic in winter and Organic Chemistry in summer. At all these Universities there are various courses on technical, applied, and special chemistry, by various professors, which are accessible.

"There are some five or six Professors of Chemistry in the Heidelburg University, and four working laboratories.

"In German Universities there are two terms per year called (*semestres*) —one commencing about the middle of October, and lasting until about March 15; the next commencing about May 15, and ending August 15. Chemical, as well as other students, must be *matriculated* in the University, which costs various prices at various Universities. Here it is about $4 40 (11 florins). Living expenses are rather less than in cities of corresponding size in America; and are, of course modified by the wants and funds of the individual. A student can live for $400 per year, expenses all in; can live easily, if economical, and buy some books, for $500; while many spend twice that. The matter of books and apparatus is an important item, and both are cheaper than in America. Both must be furnished by the student himself, the laboratories furnish nothing but the commonest articles.

"It is well to learn something of the language before coming here; but

one acquires it faster here than at home. All the principal German Chemists speak English and French, and one can pick up enough of the German language in a few months to understand lectures, although it takes at least a year to become familiar enough to work well. The best time for entering the laboratories is the Winter half year, or 15th of October, but one can enter at any time."—*Eclectic Medical Journal*, May 1857.

Prizes at the Imperial Academy of Sciences of France.—The Academy has decreed its Cuvier prize to Prof. Owen, for his Researches in Anatomy and Physiology. The prize for experimental Physiology of 2,000 francs has been decreed to Dr. Waller, an Englishman settled at Bonn, for his researches on the Spinal Ganglion. For his discovery of the application of amorphous phosphorus to the manufacture of lucifer matches, the Academy has awarded a prize of 2,500 francs to M. Schrotter. In the department of medicine and surgery, the Montyon prizes of 2,000 francs each have been awarded to Dr. Simpson for the introduction of chloroform into surgical and obstetrical practice; to M. Malgaine for his work on fractures and dislocations; to M. Jules Guerin, for having generalized the subcutaneous method; and to M. Stilling for his microscopical researches upon the spinal cord. Numerous other rewards of 1,000 francs have been adjudged, and amongst others to M. Middeldorpff, for the employment of the electrical current as a means of cauterization; to M. Brown Sequard for his observations upon the results of lesions of the spinal marrow; to M. Boinet for his researches on iodine injection in disease of the ovary; to M. Guillon for his mode of dilating strictures of the urethra; to M. Faux, for his researches on asphyxia; and M. Philippaux, for his new views on the action of caustics. The grand prize proposed by the Academy of Physical Sciences for 1847, and postponed in 1849, and 1853, and 1856, having for its subject the development of the embryo, has now been decreed to M. Lereboullet, of Strasburg; and another grand prize—subject, the distribution of organic fossils in the tertiary strata—has been decreed to M. Brown, of Heidelberg.

The next Alhumbert prize of a gold medal, 2,500 francs in value, will be for the following subject: "The fecundation of the ova, and the structure of the organs of generation in the principal natural groups of the class of Polypi, or of that of the Acalephæ.

The *Breant Legacy* of 100,000 francs has been left for the foundation of a prize, to be decreed to whoever discovers the causes or the means of cure of the cholera. Until the prize is adjudged, the interest of the capital is to be given to whoever may be deemed to have advanced our knowledge respecting cholera or other epidemic diseases, or to any one who will point out the means of radically curing *dartress.—London Medical Times and Gazette, Feb.* 14, 1857, *and Ohio Med. and Surg. Journ., May*, 1857.

Letter of the Minister of Public Instruction and Religion to Agassiz.

PARIS, *August* 19, 1857.

SIR,—A chair of Palæontology is vacant at the Museum of Natural History of Paris, by the death of M. d'Orbigny. You are French; you have enriched your native country with eminent works and laborious researches; you are a corresponding member of the Institute. The Emperor would be happy to restore to France a distinguished man of science, a renowned Professor. I offer you, in his name, the vacant chair. Your country will deem herself happy in recovering one of her children, the most devoted to science.

Be pleased to accept, Sir, the assurance of my sentiments of high esteem.

ROULAND.

Professor Agassiz's Reply.

To His Excellency the Minister of Public Instruction and Religion at Paris.

MONSIEUR LE MINISTRE,—After having passed the greater part of my life at a distance from the great centers of Science, I should never have expected to receive the distinguished honor which you have done me, by offering me, in the name of the Emperor, the chair of Palæontology at the Museum of Natural History in Paris.

The whole world considers the *Jardin des Plantes* as the most important establishment in existence for the Natural Sciences. I have therefore felt the liveliest joy in reading your letter, and in receiving, by your offer, the proof so precious for me, that I am not forgotten in Europe. Unfortunately, your proposition finds me unable to accept it; for I could never sever abruptly the ties which for a number of years I have been accustomed to consider as binding me, for the remainder of my days, to the United States. Moreover, I cannot suppose that the instruction which was intrusted to M. d'Orbigny could be interrupted for a sufficient length of time to permit me to finish certain embryological labors which I have undertaken, with a view of comparisons with the fossils of the epochs anterior to our own, and which would lose all their interest if they should be left incomplete. I find myself, therefore, under the painful necessity of refusing a position which, in every circumstance, I shall always regard as the most brilliant to which a naturalist can aspire.

It may appear to you strange that I should allow a few ovules and embryos to weigh in the balance which is to decide for the remainder of my life; but, doubtless, it is to this absolute devotion to the study of nature that I am indebted for the confidence of which you have just given me a mark as signal as it is unexpected; and it is because I would continue to merit this confidence for the future, that I have taken the liberty of entering into these details. Allow me also to correct an error that has been circulated in reference to myself. I am not French. Although of French origin, my family has been Swiss for centuries, and I myself, though expatriated for more than ten years, have not ceased to be Swiss.

I beg your Excellency to receive, with the reiterated assurance of my lively regrets at my inability to except the chair that you offer me, the assurance of my high consideration. LOUIS AGASSIZ,

Professor in the University of Cambridge, United States of America.

Cambridge, Sept. 25, 1857. [*Boston Daily Adv. and Eclec. Med. Jour.*

Aquarium.—The aquarium has already become a common source of amusement and instruction. The cultivation of water plants, as the Victoria regia, and experiments in pisciculture have contributed to this result; and also, the researches of Mr. Warrington, on what is called the organic equilibrium for waters, so that the water in a globe, by a proper selection of kinds of animals and plants, may be kept pure and wholesome for the species without changing it.

The first idea of such aquatic reservoirs is attributed in the Cosmos to Mrs. Power, a lady of French descent, but English by marriage, known to naturalists for her important researches on molluscs.

In 1832, Mrs. Power took up her residence on the coast of Sicily in order to study the molluscs and other marine animals. She remained there ten years, and made two aquaria, one for molluscs without shells and the other for those with shells. The bottom of the aquaria was covered with sand, stones with sea-weeds attached, branches of corals, star fish, different crustaceans and some small fishes, while her principal object of study was the *Argonauta Argo*. Situated on the coast she could readily change the water of the aquaria; the plan since developed by Mr. Warrington was not then understood.

Mrs. Power also used marine cages, called in Italy "Gabiole alla Power," in England "Power cages," which she had constructed in the lazaretto of Messina. Stones with algæ, and corals with adhering shells, were introduced, and then, the Argonauta, Echini, fishes, etc. The feeding of the animals was attended to twice a day. A staging was erected just above the water's surface, where the cage could be raised near the surface; and the animals conveniently examined; and there Mrs. Power sat during the long hours carrying on her observations, witnessing the Polypus or Cephalopod of the Argonaut mending its shell, and studying the habits of many other species.

Mrs. Power also constructed a portable aquarium for studying small molluscs. Her researches were continued through fifteen years, and many important results were contributed by her to the progress of science.—*American Journal of Science and Arts.*

Compressed air.—It is well known that in the construction of the Franco-Italian railroad it is necessary to tunnel Mount Cenis through a distance of several kilometers in length. To supply the air needed for the workmen for respiration, it has been proposed to use powerful pressure. But no

means of accomplishing this result have been devised, and the project of tunnel is suspended. It is found that an increase in the length of a tube connected with a blowing machine diminishes, at a rapid rate, the intensity of the movement. This calls to mind the experiment of Wilkinson, who established the fact of the resistance exerted by the walls of a pipe on the velocity of the compressed air. M. Daru, engineer on the Northern railroad, has added the following facts meriting consideration. A wheel which made thirty revolutions a minute in driving a blast through straight pipes one metre long, made only twelve when the pipes were four meters long and were bent twice at an angle, one of them right and the other very obtuse. When, on taking the air from close at hand, the effect produced was great, it was very feeble when it came through ten meters long with a right angled bend.

In the experiments by Wilkinson, the compressed air ceased to be transmitted at 280 meters; and it is not 280 meters, but a length of several kilometers, which must be met at the tunnel of Mount Cenis. The question therefore is far from being resolved.—*Ibid.*

Soft sulphur for stopping teeth.—M. H. Henriot has successfully employed soft sulphur as a substitute for the numerous cements used for decayed teeth. This substance, which acquires in a little time after its introduction in the cavity a considerable degree of hardness, is insoluble in all bodies in the cold. It is not attacked by any of the alimentary substances or dentrifices, and is easily and quickly applied. All that is necessary is to put some fragments of sulphur, or better, some washed flowers of sulphur, in a glass tube, sealed at one end, heat it over a spirit lamp, and pour into cold water. The sulphur should be heated to a temperature above 390° F., when we obtain, on pouring into cold water, a spongy mass, brown, soft, and elastic, which is called soft sulphur. It is known that the melted sulphur, if the temperature is sufficiently high, becomes thick and viscous, which is then again rendered fluid. The preparation thus obtained is introduced in the form of little balls, which are pressed into the decayed tooth. The soft sulphur may be prepared in two minutes.—*London Pharm. Journ. from Journ des Connais. Méd.*

Cements for stopping the teeth.—M. Vagner recommends the following: A drachm of gutta percha, softened by hot water, is to be worked up with catechu powder and tannic acid, of each half a drachm, and with a drop of essential oil. For use, a morsel is to be softened over the flame of a spirit lamp, introduced while warm into the cavity of the tooth, and adapted properly. The mass becomes hardened, and even after several months exhibits no traces of decomposition. M. Pouton states that we may also obtain an excellent cement by dissolving one part of mastic in two of collodion. Having well dried out the cavity, a small ball of cotton soaked in some

drops of the solution is to be introduced. It soon solidifies, and may remain in situ, seeming also to exert an influence on the further progress of the caries.—*Virginia Med. Journ., from Rev. Médicale.*

Non-susceptibility of the Hedgehog to the influence of poisons.—Scarcely any poison will act on the hedgehog. Pallas gave to one a hundred cantharides, which he seemed to relish very much, and suffered no inconvenience whatever from them. Lassy caused one to be bitten by a viper several times, without any effect following. And Mr. Cuthbert Johnson states that prussic acid, arsenic, opium, and corrosive sublimate, have each been given to this animal, without producing the slightest action upon *him.*—*St. Louis Med. Journ.*

Loss of French Troops in the Crimea.—Dr. Scrive, who acted as physician-general to the French army during the last war with Russia, has just published a book which contains a painful account of the losses and sufferings endured by the French troops landed in the East, but particularly by those engaged in the siege of Sebastopol. Of 309,278 officers and men sent from France during that short war, 200,000 entered the hospitals, and were treated professionally, 50,000 for wounds received in action, and 150,000 for diseases of various kinds contracted during the campaign. The first troops which embarked in France were attacked with cholera, which followed them to Athens, Gallipoli, Varna, and the Dobrudstcha. On their arrival before Sebastopol the cholera again attcked them, and the receptions in the military hospitals during the month of January, 1855, amounted to 9,000. They were chiefly treated for cholera, scurvy, frostbites, and wounds of every description. Typhus fever shortly after set in. The health of the army was better during the spring of 1855, but the cholera reappeared in July, and placed 4,500 men *hors de combat.* Typhus fever set in again, and added to the mortality. On the 8th of September, Sebastopol was taken by the allied armies, but, nevertheless, between the 1st of September, 1855, and the 1st of April, 1856, of 145,120 French troops under arms in the Crimea, 48,000 entered hospitals. Dr. Scrive says that the scurvy prevailed at this period, the constitution of the men being impaired through fatigue and privations. He further adds, that the most disastrous period of the campaign, in a medical point of view, was during the months of February and March, 1856. A violent typhus, engendered by the infection of the heaps of refuse in the camp, struck down more than 19,000 soldiers at the end of the campaign, notwithstanding the precautions adopted by the medical staff. It is said that the number of sick in hospital, in proportion to the force under arms, was never so great in any former campaign. Of the medical staff, 83 physicians or surgeons fell victims to their devotedness—"an enormous figure," observes the author, "when one reflects on the small number employed."—*Med. Times and Gaz.*, Nov. 28, 1857.

A Copying Ink for printing with the ordinary copying press, giving an impression analogous to that of writing ink, has recently been introduced in England. The ink is made of ground nutgalls, fourteen pounds; of sulphate of iron, six pounds; of gum senegal, twelve pounds; of soap, three pounds; of molasses, four pounds; of Prussian blue, three pounds, and of filtered rain fifteen gallons. The nutgalls are boiled three hours in the water, and the clear liquid drawn off. The gum and sulphate of iron are then separately dissolved in the water, and the whole is mixed with the nutgall decoction, and exposed for about three weeks to the atmosphere, when the liquid is drawn off from the deposited matters and sediment. The molasses and soap are now added to the fluid, and the whole evaporated in a water bath, to nearly the consistency of ordinary printing ink, and the lampblack and Prussian blue are then mixed with it. The above ingredients form a black ink; but any other color may be obtained by using corresponding soluble coloring materials. The new ink is received with much favor, by the Post Office and other departments of the British government, and by railroads, insurance, banking, and other companies who usually have much copying to do.—*American Druggists' Circular.*

New Fluid for the Blowpipe-Lamp. By F. Pisani.—The author recommends for this purpose a mixture of 6 vols. of alcohol of specific gravity 0·848 with 1 vol. of turpentine and a few drops of ether. Wood-spirit may be substituted for alcohol, and of this 4. vols. are sufficient. The liquid must be perfectly limpid, as otherwise the undissolved excess of turpentine will cause the lamp to smoke.

Of the calorific effect of this fluid the author gives the following examples. A platinum wire 2-10ths of a millimetre in diameter was fused at the extremity by the ordinary blowpipe. An iron wire of 3-10ths of a millimetre was also fused in a globule 2 millimetres in diameter. M. P. Schmidt fused 4.6 grs. of copper and 23·5 grs. of silver in a cavity in charcoal, and also performed cupellations with as much as 5 grms. of argentiferous lead.

On the average, with a little practice, 2 to 3 grms. of copper and 15 grms. of silver may be fused by it, and cupellations may be effected with 3 grms. of lead. Carbonate of soda is fused by it with as much ease as cyanide of potassium by the spirit-lamp. The reducing flame, which is recognised with difficulty with other combustibles, makes its appearance here very distinctly.—*Chem. Gaz. Jan.* 15, 1858, *from Comptès Rendus, Nov.* 23, 1857.

Editorial Department.

ST. LOUIS PHARMACEUTICAL ASSOCIATION.—In our last we announced the reconstruction of this society. The following communication gives some additional information regarding the same movement. The body of Pharmaceutists in St. Louis, in justice to their character and number, should earnestly support their Association, by attending its meetings and making them seasons of pleasurable intercourse in matters pertaining to the business and ethics of pharmacy. There is nothing like such meetings, well attended, to break down jealous feelings and estrangements arising out of business competition. Those who, when viewed through the distorting medium of mistaken interest, seem enemies in disguise, become reasonable and respectable men, when, by friendly interchange of sentiment, the ice of distrust is broken. There are numerous ways in which we can benefit each other without hurting ourselves; and it only needs an honest, straightforward course to make good friends of those who have been, without any sufficient reasons, practically enemies for years.

St. Louis, January 15th, 1858.

MR. WILLIAM PROCTER, JR:

Dear Sir,—In the last number of your excellent Journal an account was given of the proceedings of a preliminary meeting for the re-organization of the St. Louis Pharmaceutical Association. It is now with pleasure that I forward you intelligence of its thorough organization upon a permanent basis, by the choice of the following named gentlemen to serve as officers during the ensuing year:

JAMES O'GALLAGHER, President.
THEODORE KALB, 1st Vice President.
HENRY REYNOLDS, 2d Vice President.
ALEXANDER LEITCH, Corresponding Secretary.
EUGENE L. MASSOT, Recording Secretary.
WILLIAM H. DORNIN, Treasurer.

JAMES MURPHY,
WILLIAM B. PARKER,
THOMAS SCOTT,
ENNO SAUNDERS,
A. GODRON,
} Executive Committee.

The Society being now established upon a firm foundation, it is confidently expected that in future the Pharmaceutical Association of St. Louis will rank high among those of the Union, and that through her influence the science may meet with a rapid advancement in this portion of the Great West. I have the honor to subscribe myself as

Yours truly,

ALEX. LEITCH, Cor. Sec'y.

THE SYDENHAM SOCIETY.—From the Medical News, for February, we learn that the Sydenham Society, of London, which for many years past has been republishing valuable old medical works, has ceased to exist. Great efforts are being made to reconstruct it, and the editor of the News expresses the wish that, if successful, the publications of the Society will be more modern in their character.

BANK NOTE ENGRAVING AND INK.—Our friend Charles T. Carney has become a great adept in the art of testing the quality of bank note engraving as regards its indelibility. The activity with which counterfeiting is carried on by photographing and engraving has caused a universal interest among bankers to get an ink that cannot be removed from the paper without destroying it, and to make additional security, colored counter impressions in colored inks have been employed. It is especially in reference to these last that attention has been given, to get them so permanent that they cannot be removed from the paper without destroying the impression beneath. Such an ink, called "*The Canada Bank Note printing tint,*" was submitted to Professors T. Sterry Hunt, John Torrey, Wolcott Gibbs, B. Silliman, Jr., and E. H. Horsford, who all certified to its indestructible character. Mr. Carney having one of the notes printed with this ink submitted to him, returned the note uninjured, with one half of the green tinting removed, which he can effect by two distinct methods. It is well for the banks that our acute friend is an honest and respectable pharmaceutist of Boston.

The Elements of Materia Medica and Therapeutics, adapted to the American Reformed and Eclectic Practice; with numerous illustrations. By J. KOST, M. D., Professor of Materia Medica in the American Medical College, Cincinnati, &c. New edition, revised and enlarged. Cincinnati: Moore, Wilstach, Keys & Co., 1858. Pp. 829.

That portion of the medical practitioners of the United States, who distinguish themselves as a body by the term "Eclectic," appear in a fair way to be supplied with a medical literature of their own "getting up." The wide scope of choice which they claim in the selection and adoption of medical ideas from all systems of medicine, is applied with the same free hand when particular branches of the subject are to be illustrated in print, with an additional advantage, arising from the fact that they are not hampered by the ethics of the National Association, nor bound down to the scientific exactitude of pharmacopœial nomenclature or processes. With the Journals and works of the regular medical profession before them, works that have been built up by the united labors of its members during past ages, and especially the present prolific period of observation and experiment, the process of compilation and transformation goes on simultaneously; and when the new volume issues from the press, for aught the careless observer or reader can tell, it is a masterpiece of Eclectic original-

ity. Scores of poor investigators, whose only recompense for long days of unremitting labor in the laboratory, or study in the closet, has been the gratification arising from a public acknowledgement of their services to science by the authors of the profession, are passed over in silence, whilst the results of those labors are appropriated with an unscrupulousness as unsparing as it is thankless. These remarks are intended in no invidious sense; they apply to a number of works of the Eclectic school, the scope of which are sufficiently great to indicate at least the authorities on which much of their text is founded; and without which reference, the value of the book is injured for those students who desire to seek knowledge in its original sources. In a work on Materia Medica and Therapeutics, which pretends to enter fully on the details of the subject, the author must give the authorities as he proceeds, else the veracity of the work will rest merely on his unsupported statements, and leave no means of correcting by comparison with the original papers. In glancing over the treatise before us we find it obnoxious to criticism for the same short-coming, though perhaps in a less marked degree. We look in vain for evidences of that laborious research which has ransacked the primary depositories of scientific knowledge—the Journals—and for that accuracy of observation and comprehension of the subject which characterize the standard treatises. Avoiding the rock upon which a contemporary split, the author has been careful to keep beyond the reach of the law of copyright in making copious quotations from Royle and Pereira, which are interspersed through his pages, like patches of silk on garments of cotton.

The author describes Eclecticism to be that school of medicine which is based on "Physio-dynamic action," or the power of nature; and disclaims the use of poisonous agents as means of cure. Physio-dynamic remedies are described to be such as are dependent for their action upon the natural vital force of the system, and not upon chemical and mechanical laws. The arrangement adopted is therapeutical: 1st, EVACUENTS, as emetics, cathartics, diaphoretics, diuretics, expectorants, emmenagogues, anthelmintics, sialagogues and errhines. 2d, IMMUTANTIENTS, or NON-EVACUENTS, as stimulants, tonics, astringents, nervines, alteratives, rubefacients, derivatives, or revellents, &c. 3d, CHEMICAL REMEDIES: acids, alkalies and earths, antidotes and mechanical remedies, emollients, &c.

The author is evidently a disciple of Thompson when he treats of lobelia and capsicum, and in his repudiation of the very word narcotic; yet, unlike that noted individual, he is a strong advocate for cathartics and anodynes, and, while he repudiates opium, and does not give it even the small corner conceded to mercury and antimony, he devotes four pages to morphia, disguised under the erroneous name of *papaverine*, a term already applied by Merck to one of the opium alkaloids wholly distinct from morphia. There is so much cool assumption in the wording of this article that we must give it a little space:

"PAPAVERINE.—This is the purely anodyne principle of opium. In the former edition of this work, a process was given for the preparation of this principle from the capsules of the poppy, and was called denarcotized extract of papaveris. But experience has led to its preparation from opium, as affording the principle with the most facility. The article is now very extensively used in the reform profession."

The author then gives *Mohr's process for morphia by lime and muriate of ammonia* in minute detail, without one word of explanation as to whose it is or where it came from, and then remarks,

"The product of this process is a light grey or ash colored crystalline powder, which amounts to about 8 or 9 per cent. of the weight of the opium used, if the latter be good, and the process is well conducted. It is very bitter, and possesses *all the anodyne power of the opium without its narcotic and tetanic principles.*"

He then goes into a detailed explanation of the well known reactions involved in the process of Mohr, during which it is said that "the *narcotic* power of opium has long been acknowledged to depend upon the NARCOTINA (!), and the *tetanic* upon the THEBAINA." The author further remarks:

"The anodyne power here called *papaverine*, is not in the least more effective as an anodyne than the salts of morphia; nor is it different in principle from one of the three prominent constituents of these salts, *i. e.* the principle called *morphia.* The case is that in this process the morphia (papaverine) is separated as a *neutral (!)* and purely anodyne principle. In the other, the salts, that is, the muriate, sulphate, acetate, etc., are *tribasic*, having *morphia, narcotina* and *thebaina* conjointly in combination with the respective acids," &c.

It will be news to our manufacturers, that their salts of morphia are *tribasic;* and if Dr. O'Shaughnessy is living, what will he think of the statement, that his favorite remedy for intermittents should be decided to be *the* narcotic principle of opium, a notion long since exploded. The author evidently knows little of practical chemistry to make such gross blunders. It is an attempt at reconciling the use of this long proscribed narcotic to his brother "reformers," under the guise of a word which has a double meaning. Morphia is a poison, but papaverina is only the pure anodyne principle of opium freed from its dangerous qualities! It is hence presumable that the deaths which occur from over-doses of morphia are due to traces of narcotina and thebaina!

Under the head of *Veratrin*, the author speaks of Veratrum Viride, and seems doubtful whether it deserves a place in the reformed materia medica, "*since narcotics, as necessary medical agents, are absolutely and properly rejected by true reformers in medicines.*

One of the most prominent faults of the book, is the want of care in giving recipes for preparations, and in quoting authorities; for instance, at page 633 we find the following:

"*Syrup of Wild Cherry Bark.*—R. Wild Cherry Bark, in powder; water q. s., exhaust in a percolator, and add sugar enough to preserve it."

"*Syrup of Tolu.*—℞. Tincture of Tolu f. ℥ j; syrup Oiss; mix and boil down in a water bath to a proper consistence, U. S."

Speaking of the syrup of ginger, it is remarked at page 396, "A very good preparation of this kind may be made by dissolving a suitable quantity of white sugar in a strong tincture of ginger."

Another indication of the want of care in compilation is the entire ignoring of recent discoveries in the composition of important substances in the materia medica—for instance, no mention is made of aloin, or its investigation by Smith, Robiquet or Groves. The origin of Balsam Peru is referred to South America. "The active principle of seneka is said not to be satisfactorily indicated, and is attributed to something analogous to extractive, since we find that water, alcohol and ether will equally well extract them." Now it is well known that the polygalic acid of Quevenne *is* the active principle of seneka, that it is insoluble in ether, and that it has been used in medicine as a perfect substitute for seneka.

On the other hand, there are many things in the volume of Dr. Kost which merit the attention of the regular physician, especially the Therapeutics of Eclecticism. Practice and experience have materially modified the standing and quality of the body called Eclectics; much they have gained by observation, much by hearsay from inferior sources, of the use and qualities of many indigenous plants, unknown or but slightly understood by regular practitioners. These they are verifying by trial, and undoubtedly are developing many valuable facts. The contracted therapeutics of Thompsonianism, and its limited materia medica, are disappearing in the voluminous admixture of regular medicine, and new discoveries, in the literature of Eclecticism, and in a few years it will be difficult to detect even the outline of the stern features of the doctrines of its founder. We believe the activity of lobelia has been over-rated in regular treatises, owing to the prejudice which clings to its early history; and whilst its unchecked use has undoubtedly been productive of much evil, its valuable qualities afford good ground for the belief that the medical profession would do well to give it more attention than they have hitherto accorded.

Among the contributions of the Eclectics which also merit attention, are their applications of podophyllum, leptandra, sanguinaria, caulophyllum, cypripedium, and some other plants, which to some extent have been tried by physicians, and in some instances highly approved.

In conclusion, we would remark, that if the volume of Dr. Kost should get to another edition he will do well to submit his pages to the revision of a practical pharmaceutist, who will correct the numerous chemical and pharmaceutical defects which occur in the pharmaceutical portion, and which, though we have not pointed them out for want of space, will in many instances mislead the reader. The book is well printed and bound, and creditable to the enterprising publishers. It may be had in this city, of H. Cowperthwait & Co.

The American Eclectic Practice of Medicine. By J. G. Jones, M. D., late Professor of the Theory and Practice of Medicine, in the Eclectic Medical Institute of Cincinnati, etc. Extended and revised at the request of the author, by Wm. Sherwood, M. D., Professor of Medical Practice and Pathology, &c., &c. Two volumes, octavo. Cincinnati: Moore, Wilstach Keys & Co. Pp. 1660.

The above is the title page of two ponderous volumes on the practice of medicine of the Eclectic school, which have been sent to us by the publishers for notice. As, however, their subject is not within the province of this Journal, which has rarely given place to notices of works on practice; and especially, as to do justice to its contents more space would be required than could be allotted; we must pass it over to the Medical Journals, who will doubtless give it such attention as its merits or demerits may demand. In justice to the publishers, we must remark that the volumes are in good style and execution, and for their sake we hope the contents may prove useful to those for whom they were written. It may be had in this city of H. Cowperthwait & Co.

Materia Medica, or Pharmacology and Therapeutics. By William Tully, M. D. Vol. 1, Nos. 23 and 24. Sept. 1856.

The work of Dr. Tully has now arrived at its 1534th page, which completes the first volume. The present numbers treat of Esstomatics, Emetics, and Cathartics. An Index is attached, which gives some idea of the great variety of topics discussed in the volume.

The Physician's Hand-Book of Practice, and Memoranda for 1858; containing a classified list of diseases, with their symptoms, complications, etc.; an alphabetical list of remedial agents, with their properties, preparations and doses; a classified list of poisons, with their symptoms and antidotes; examples of extemporaneous prescriptions, and abbreviations of the terms used in prescribing, with their translation into English. To which is added, a Record for Daily Practice, prepared for the names of 30 or 60 patients, and other memoranda. Second edition. By William Elmer, M. D., and Levi Ruben, M. D. New York; Stringer & Townsend, 1858.

The long title page of this little pocket volume goes far to explain its objects and uses. Nearly one hundred pages are devoted to the subjects therein mentioned, and the remainder is in blanks for memoranda and daily records of visits. Of the great body of practising physicians, a large number are not so thoroughly grounded in the details of the science of medicine, but that they will find this little pocket companion useful on numerous occasions, as a remembrancer of well known facts needed on emergencies arising during the process of visiting patients when text books are not within reach. Besides, it embraces what every physician should

carry, a permanent record of his daily visits; and being in pocket-book style, with a pocket, it may be used as a substitute for that necessary item of a business man's equipment. It is covered with morocco, fastens with a tongue, is gilt edged, and altogether is gotten up in the best manner.

Transactions of the Illinois State Medical Society, for the year 1857. Chicago. Pp. 128, octavo.

The reception of this pamphlet is acknowledged. Among the papers and reports it contains, is one from "the Committee on Drugs and Medicines," by H. A. JOHNSON, M. D., of Chicago, in which we are informed that Dr. E. P. Wood, of Wisconsin, has called attention to a plant known in the region of Prairie du Chien, as Indian Quinine or Ague Weed, which is largely used in domestic practice as an antiperiodic. The plant is stated to be the Gentiana Quinqueflora, which grows abundantly on the prairies, and flowers late in the fall. In view of the immense demand for the expensive products of Cinchona, Dr. Johnson thinks that physicians should embrace every opportunity to get substitutes for them. Attention is directed to the valuable properties of Glycerin, and the American Pharmaceutical Association is spoken of as being zealously engaged in the pursuit of the objects of its formation.

Dr. C. Goodbrake, of Clinton, Ill., makes a report favorable to the remedial value of Asclepias Tuberosa. He thinks that it possesses valuable diaphoretic properties, and remarks, "In its action on the system, it somewhat resembles the Dover's powder, for which it forms, in many cases, a very good substitute, without the objection which frequently obtains against the use of the Pulv. Doveri, of causing cerebral disturbance, or checking the secretion of the kidneys." The drug is particularly recommended in the diarrhœa and dysentery of children.

The Peninsular and Independent Medical Journal. Devoted to Medicine, Surgery and Pharmacy. Editors, A. B. PALMER, M. D., and MOSES GUNN, M. D., of the University of Michigan, and FREDERICK STEARNS, Pharmaceutist, of Detroit. April 1838. Higby & Stearns, publishers.

We have copied the above from the title-page and prospectus of a new Medical Journal, to be published at Detroit, commencing in April next, and which is formed by the union of the two Journals indicated in its name. The editorial corps is new, and has the novel feature of a special Editor for the Pharmaceutical department. The publishers design their Journal to be an independent organ, devoted to the whole interests of the medical profession. From the well known energy and ability of the pharmaceutical Editor, we look forward with interest to his department of the new Journal, and, if we may draw an inference from his contributions to the Proceedings of the American Pharmaceutical Association, we feel as-

sured that he will enrich the "Peninsular and Independent" with many valuable and interesting papers.

The time is drawing near, when the nominal tuition in Pharmacy, which appertains to even the best medical schools in this country, will have to be superseded by a special department, teaching certain portions of what is now taught by the chairs of materia medica and chemistry, united to, and in, a practical and demonstrative course on pharmacy, in all the relations in which it can prove useful to the physician. Such positions will have to be held by practical pharmaceutists, who, by study, have prepared themselves to fill the functions of such a chair with honor, while, at the same time, their connection with the pharmaceutical profession and business will keep alive and constantly renew their interest in its progress. The recent creation of a chair of Pharmacy in the Academie de Medicine, and the appointment to it of M. Soubeiran, shows how the matter is viewed at one of the centres of medical teaching. It may be difficult at first to find pharmaceutists who have properly qualified themselves for such positions; but if the movement ever proves successful, it will be by taking such teachers from the pharmaceutical body, as much more likely to insure the kind of tuition needed by medical students, to fit them for prescribing with the effect, and in the forms, best calculated to meet the cases treated.

The Pacific Medical and Surgical Journal. Edited and published by JOHN B. TRASK, M. D., and DAVID WOOSTER, M. D. San Francisco, (Cal.,) 1858, Vol. 1, No. 1.

The above is the title page of a new California Medical Monthly, illustrated by two lithograph engravings executed in San Francisco. The astonishing progress of the El Dorado of the West, is in no instance better illustrated than that, after ten years existence, a Monthly Journal of Medicine, of forty-eight octavo pages, should be issued. The Editors propose to give us reports from the cities of the South West Coast, Oregon, and the Polynesian Islands, when possible. For our own interest we will invite them to keep a corner open for all that pertains to Materia Medica and Pharmacy, aboriginal or exotic, both in their therapeutical and natural historical relations. We will exchange with pleasure.

The Chicago Medical Journal. Edited by N. S. DAVIS, M. D., and W. H. BYFORD, M. D. January, 1858. Monthly, pp. 50, Vol. 1, No. 1,

Has been received and will be placed on our exchange list.

Life; its Relations, Animal and Mental; an Inaugural Dissertation. By J. DICKSON BURNS, A. M. M. D., Charleston, 1857, pp. 58,

Has been received.